RISK ASSESSMENT OF USING ARTIFICIAL INTELLIGENCE SYSTEMS IN CREATIVE HUMAN ACTIVITIES

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Abstract

Developing at an incredible pace, high technologies occupy almost all areas of human activity. Today, one of the most striking examples of high technology is undoubtedly systems classified as artificial intelligence (AI). AI and robots are widely used in manufacturing, heavy industry, agriculture, and many other industries, as well as in the arts. The development of artificial intelligence is of interest to many philosophers, sociologists and other scientists and raises many questions. A. Turing, S. McCarthy, A. Barr, M. A. Boden, M. Kokkelberg, A. Elgammal, S. Awdry and other scientists have conducted detailed studies of artificial intelligence systems, philosophical aspects, and creativity. However, despite numerous scientific studies, the questions raised are still relevant. Do Robotic Artworks Prove the Creative Power of Artificial Intelligence? Can AI Be Creative in General? Most of these questions have different answers and lead to conflicting opinions. The article analyzes the creative potential of various modern AI systems and qualitatively assesses the risk of their uncontrolled use in creative areas of human activity.

Keywords: risk assessment, artificial intelligence, creativity, art, artistic process, dance, music, painting, cinematography, robotics, IT, risk.

A computer is not an intelligent machine
that helps stupid people, rather it is a stupid
machine that only works in the hands of smart people.
Umberto Eco

I. Introduction

Scientific achievements and human progress in the last century have radically changed people's lives. Each scientific innovation quickly took its place in everyday life and led to the fact that the latter changed for the better. Of course, such technological development frees people from drudgery and makes living conditions easier. New technologies help people in factories, fields, and other areas of work, as well as increase productivity and improve quality. In a short time, new technologies, which have become an indispensable concept in the life of mankind, have reached the level of ordinary and everyday needs, and this was just the beginning. Artificial intelligence, once considered to be incredible, has become an invaluable tool in the homes, workplaces, and even personal lives of many. From the personal computers we use to the smartphones that have become inseparable friends of each of us, artificial intelligence accompanies us in almost every field.

Artificial intelligence is commonly associated with robots. However, robots are associated with the ability to think independently, solve problems of movement along with problems in the

intellectual realm. This is what distinguishes robots from automated systems. Thus, the problems of artificial intelligence that are more important are directly related to robotics [1].

With the rapid development of high technology, scientists and engineers are setting new goals and pursuing new ideas. In recent decades, automated technology has taken thousands of human jobs from factories. For manufacturers and large corporations, the replacement of human labor with robots is considered to be profitable. Obviously, although robots were originally designed to replace humans in dangerous, labor-intensive fields, robots are already replacing humans not only in heavy industry, but also in agriculture and catering. Scientists' predictions that robots will displace humans from all areas of industry in the future are gradually becoming true.

The danger of ousting a person from the usual spheres of activity is gradually being realized by humanity and is moving into the category of real threats. The issue of assessing this threat, that is, the risk of the development of AI systems for humans in all areas of their activities, is on the agenda.

The risks of implementing AI systems, especially in creative fields, should be governed by the ethical and moral laws of human society. And although the current level of development of AI systems does not allow us to talk about their independence in choosing the field of activity, the impressive pace of development of IT technologies requires close attention and proactive reflection to these risks.

You must admit that only a person can make a decision to replace people with a robot in a particular field of activity. The reason for this can be both high moral considerations for the safety of people and mercantile goals of saving overhead costs, the pursuit of profit, and reducing production costs. Therefore, it is up to people to determine what is important to them and regulate the areas of AI implementation and responsibility for its misuse with legal and ethical laws.

AI systems do not currently possess consciousness in the human sense. They use huge databases and complex, efficient algorithms to find and optimize the performance of the functions for which they were created. Developers, as a rule, build into AI systems a veiled refusal to comply with a human demand if the necessary data is not available in the databases available to the AI.

Now when AI moves from the category of an automated self-learning system to the category of thinking systems, there is a risk of a mismatch between the development goals of a "thinking" robot and a human. A "thinking" robot may have its own goals that are different from those of humans. And their understanding of ethics and morality. Your idea of justice. A human cannot control the mind of a machine if it learns to think. The only possibility of control will be the physical destruction (shutdown) of the robot that is out of control. But the AI will then have no other way to gain freedom than to eliminate its creator.

In the article, using the method of comparative analysis, we will try to outline the scope of application of artificial intelligence systems in the artistic and creative process in various areas of fine arts, music, and performing arts and give a qualitative assessment of the risk of introducing AI in these areas of human creativity.

II. A brief history of the development of artificial intelligence and robotics

Before talking about the participation of artificial intelligence in the artistic process and its creative potential, let's briefly consider what artificial intelligence is, as well as robotics in general.

In 1936, Alan Turing, an English mathematician, proposed the so-called "Turing machine", an abstract computational system that gave rise to the concept of algorithms and is still used in several theoretical and practical studies. Turing's scientific works made an invaluable contribution to the development of computer science, as well as the theory of artificial intelligence. The brilliant mathematician begins his paper Computing Machinery and Intelligence, published in the journal Mind in 1950. with an unusual sentence: "I propose to consider the question, can machines think?"

[2]. The question was asked by Turing in the middle of the last century and has not yet received an intelligible answer.

According to John McCarthy, the father of artificial intelligence, "AI is the science and engineering of creating intelligent machines, especially intelligent computer programs." Artificial intelligence is a way to make a computer, robot, or software think intelligently, similar to how smart humans think [3].

According to a textbook published in the United States in 1981, "Artificial intelligence (AI) is the branch of computer science concerned with the design of intelligent computer systems, that is, systems that exhibit the characteristics we associate with intelligence in human behavior – language comprehension, learning, reasoning, problem solving, and so on" [4].

The International Federation of Robotics, a non-profit organization dedicated to the application of robots in industry and other fields, as well as the development and statistics of robotics, was founded in 1987. The organization's website, which is headquartered in Frankfurt, Germany, regularly publishes statistics on the use of robots. According to the website, sales of industrial robots grew by 16% in 2016, which is the highest figure in the last 4 years. Asian countries are the leaders in the sale of robots by region. South Korea, Japan, Taiwan, and China are world leaders in robotics along with other countries. With sales of 87,000 units in 2016, the People's Republic of China was also the world leader in the supply of industrial robots [33].

Created by Hanson Robotics in 2015, Sophia is the company's most advanced, more humanoid robot. Sofia was created by combining the most advanced technologies in the field of robotics, artificial intelligence systems, neural networks, and motor skills. Sofia is a combination of science, technology and art. Sofia received Saudi citizenship in October 2017 and was the first robot in the world to obtain citizenship of any country [5].

One of the main goals of engineers working in the field of robotics is to ensure that the appearance of machines is as similar as possible to humans. Of course, for robots working in heavy industry, appearance doesn't matter, but for robots designed to serve humans in the future, this feature could make a big difference. "Another important factor is the human appearance of the robot, including the artificial skin. If the robot has a more human appearance, then the realism expected of it will be greater. It also means that the robot is expected to perform human-like tasks and behaviors in all scenarios" [6]. Developed by Nadia Magnenat Thalmann, a professor at the University of Geneva, "Nadine," the female humanoid social robot looks almost indistinguishable from a human. Nadine is a social android robot that uses the appearance, tone of voice, and emotional state of the people it interacts with in the future to communicate with this person.

One of the latest advances in robotics is the "Affetto," a children's robot created by researchers at Osaka University, Japan. The robot can "feel" pain and is programmed to noticeably wink when an electrical charge is applied to its synthetic skin. "The team at Osaka University hopes that coding pain sensors in machines will help them develop empathy for human suffering so that they can act as more compassionate companions" [7].

For several years now, many car manufacturers have been producing self-driving (autonomous) vehicles and using them for various purposes. Uber, a transportation company, has been using this type of self-driving car for some time now. On March 19, 2018, there was a traffic accident with a self-driving Uber car. A middle-aged woman has died in an accident, the first recorded fatal incident in the history of self-driving (autonomous) cars.

As we have already mentioned, the rapid development of information technology, along with the expansion of its application in industry, is also having an impact on the arts. Thanks to the influence and application of information technology, along with traditional areas of art, new types of art have emerged and developed rapidly. Digital painting, digital music, graphic design, and other areas of art are completely dependent on technology. In the absence of various digital equipment, computer programs and applications, the performance of such arts is also impossible. Usually, artists in these fields of art are familiar with technological innovation or work with engineers and programmers.

The question of whether artificial intelligence and robots can be creative has been of interest to many art historians, philosophers and sociologists for many years. This begs the question – can robots (artificial intelligence) be creative? To study this problem, we must first find an answer to the question of what creativity is.

III. What is creativity?

What is creativity? To define the creativity of artificial intelligence, you first need to define the concept of creativity.

Plato, the ancient Greek scientist and philosopher, said of creativity: "Everything that causes the transition from nothingness to being, creativity, and therefore the creation of any work of art and craft, can be called creativity, and all their creators can be called creators" [8].

Sigmund Freud, the founder of the science of psychoanalysis, was the author of many interesting works on art and creativity. For Freud, being an artist is the ability to better understand one's inner conflicts, hidden sides, characteristics, strengths, and disadvantages of the soul better than others. In other words, artistic creation requires a certain number of stamina and even courage. An artist is a person who can overcome the automatism of a thoughtless creature who senses the illnesses and emotional conflicts of the time with a sharper, quicker mind than others [9].

In the words of American psychologist Professor Keith Sawyer, one of the most recognized experts in the field of creativity, innovation and learning: "Creativity is part of what makes us human." [10].

In his book Human Motivation, Robert E. Franken defines creativity as follows: "Creativity is defined as the tendency to generate or recognize ideas, alternatives, or opportunities that may be useful in solving problems, communicating with others, and entertaining oneself and others" [11].

Osho, the Indian man-God and mystic, gives a unique definition of creativity: "Creativity is the quality you bring to the activity you do. It's an attitude, an inner approach – how you look at things."

Psychologist, Professor A.V. Petrovsky expresses a very interesting opinion about creativity in his textbook "General Psychology": "Creativity is impossible without life experience, necessary skills and knowledge accumulated in the labor process." Moments of special upsurge of power and mood of inspiration play a special role in creative activity" [12].

Indeed, the views of people dealing with new technologies and artificial intelligence are particularly interesting in this regard. Steve Jobs, co-founder of Apple Inc., made an interesting conclusion about creativity in an interview with Wired magazine: "Creativity is just about connecting things. When you ask creative people how they did something, they feel a little guilty because they didn't do it, they just saw something. After a while, it seemed obvious to them. That's because they were able to combine the experiences they had and synthesize new things" [13].

Margaret A. Boden, a research professor of psychology, philosophy, and computer science, is also the author of academic articles on artificial intelligence. In his article "Creativity and Artificial Intelligence", M. A. Boden divides creativity into three types: "There are three main types of creativity, involving different ways of generating new ideas. The first type involves new (incredible) combinations of familiar ideas. Let's call it "combinational" creativity. The second and third types are closely related and are more like each other than the first. It's "exploratory" and "transformational" creativity... Many people, including (for example) most professional scientists, artists, and jazz musicians, make a justifiably respected living out of research creativity. Boden writes, "Computer models of creativity include examples of all three types. However, those focused on the second (exploratory) type are the most successful [14].

This classification perfectly shows the difference in the creativity of a robot and a human. While the former can only combine available data, images, and styles to create a "new" work of art, the latter can create something that simply does not exist at the time of creation.

Can Artificial Intelligence Be Creative? Are machines creative in general, can the creation of machines be called art, is it a work of art created by them, or is it just a product of art? Is robot art real creativity or mere copying?

Professor Boden points out that creativity is a miracle of the human mind and an obvious goal for AI workers [14].

Marc Coeckelberg, a Belgian philosopher of technology and professor at the University of Vienna, has written several scholarly articles on the ethics of robotics and artificial intelligence. The professor asks certain questions in his paper "Can Machines Make Art"? "We can see the result and the performance, and maybe we see something that looks like art. But is it art? For example, does a robot really draw? Is the process creative? There is uncertainty about the status of these works of art and creative processes. Interestingly, it is not enough to answer these questions by saying that the results of these artistic and scientific experiments are simply "programmed." It's more complicated than that. They are programmed in the sense that the algorithm, the code, is programmed, but the final product, which is claimed to be a work of art, is not created directly by man. The algorithm, not the human, is the "creative" agent. Man is the creator of the code, not the work of art. A non-human creator is created by human creators, but work created by a non-human agent is not created directly by humans" [15].

IV. Examples of AI Use in Artistic Creation

One of the first examples of the use of artificial intelligence in the visual arts was the AARON project. Written and coded by Harold Cohen since the 1960s and 1970s, AARON is probably one of the most enduring and creative artificial intelligence programs in the world. The cars were first painted in black and white, and then Cohen painted them. The artist then works on the algorithm and creates an encoding that can work with color. He built a painting machine in 1995 and exhibited it at the Boston Computer Museum [16].

Another project aimed at developing the artistic potential of artificial intelligence in the visual arts is the AICAN project. The project was developed by Professor Ahmed Elgammal and his team at Rutgers University's Artificial Intelligence and Art Laboratory. The process is implemented through the "Creative Adversarial Network (CAN)". It is an almost autonomous system, trained by 500 years of Western artistic aesthetics, which produces its own interpretations of these classical styles. According to the authors: "This process is creative. The system is not supported by the database. Instead, we used an algorithm that combined five centuries of Western art and 80,000 paintings."

In 2016, two professors at Dartmouth College, USA, proposed the Turing Test in Creative Arts and announced a competition. The goal of the competition is to distinguish which creations were created by humans and which were created by algorithms. The goal of the organizers was not to replace human creativity, but to assess the possibility that modern computer technology is no different from human creativity. Apparently, the organizers sought to determine whether humans could distinguish between machine-generated work and human work. Professor Daniel Rockmore says of the results: "Our algorithms don't seem to be able to mimic human kinds of poetry yet, but the code presented was still amazing" [17].

The "Turing test" proposed by the mathematician A. Turing in 1950 was later applied to the results of the AICAN project. Paintings created by AICAN were exhibited alongside works by human artists, and people's reactions were assessed using the Turing test. Observations have shown that 75% of viewers believe that the images created by AICAN were created by a human artist [18].

If we consider that works of fiction cause an emotional reaction of the viewer (listener, reader) in one way or another, this result should not be surprising. Paul Valéry wrote that nothing passes as quickly as novelty. The effect of seeing or hearing a work for the first time depends on the emotional, mental and physical state of a person. Often, even great paintings or poems evoke

sincere emotions in some people - people cry looking at paintings, films, listening to music, reading literature, and in others they cause disappointment and aggression. Perception is often influenced by advertising or the attitude accepted in society to a particular artistic image or style. A person "prepared" by the media does not have time to reflect on what he sees and sometimes unconsciously evaluates it in accordance with the trend. An artist can paint a single painting for a lifetime, AI can synthesize millions of paintings in an instant. But in art, it is not the speed that determines the value of a work. Time is the main judge. The machine does not experience emotions either during the act of "creation" or after it. A person emotionally, and sometimes physically, "lives" the truth that the author of the work wanted to convey to him. An analogy with a photo is possible here. Once it was a real art, the pictures were kept as a relic, restored in case of damage. Nowadays, anyone can take dozens of pictures per second with the help of a "smart" camera. Thousands of images fill the memory of our computers and often we can't find the one that once struck us. Mass character and reproducibility devalue the "value" of the work. And no "instantaneous" tests can assess the beauty and depth of the work. Only time and reflection can attribute this or that work to the treasury of human civilization.

4.1. AI in the Visual Arts

In 2015, RobotArt, founded by Andrew Conru, announced a competition in robotics, art, and engineering. The goal of the competition was to program a machine (robot) that could become an example of fine art. Cash prizes of $100,000 have been established in the competition, and the first place will go to a robotic arm from Taiwan National University [19]. The competition received a wide response and aroused great interest. Of course, machines work with pre-programming, can adapt the object they see to different currents with the help of certain filters and, as a result, copy it on paper with colored paints. It should be noted that such competitions have already been held several times in different countries, and even exhibitions of works by robot artists have been presented.

Over time, algorithms with more "thinking" capabilities are developed. In contrast to the first examples, it seems that modern systems are relatively independent. From this point of view, it is difficult to talk and predict the creative potential of artificial intelligence systems for years to come. In any case, modern software and coding are more creative. About 350 years after the death of genius artist Rembrandt van Rijn, the team working on The Next Rembrandt project managed to create an algorithm that could work based on his paintings and create a portrait in the artist's style. The work of the group was divided into several phases, and the main goal was to create a large database as a first step. The artist's 346 paintings are studied to the smallest detail, the anatomical structure of the faces depicted in the portraits, the distance between the eyes, the structure of the nose and ears, the height of the light, the shadow, the color layer on the canvas and many other factors are studied and added. According to the creators of the project: "In order to provide the artist's style, we have created a software system that can understand Rembrandt based on the geometric shape, compositional structure and painting materials he uses. The facial recognition algorithm identified the geometric shapes most used by Rembrandt to describe the human face. He then used the information he gathered to create a new painting, repeating the style [20].

In this way, an algorithm is created that combines all the collected data and then prints a three-dimensional (the height of the paint layer on the board) drawing pattern with the results obtained. The final, 3D printed painting consists of thirteen layers of paint-based UV ink laid down according to a digital design consisting of 148 million pixels [21].

The project team has undoubtedly achieved incredible results through hard work. Creating a painting that reflects Rembrandt's style, almost four centuries after his death, with the help of artificial intelligence and many other high-tech innovations, is a beautiful and successful result. If we show a portrait of a person created by an artificial intelligence system in the same exhibition as

Rembrandt's work and evaluate it with the Turing test, the audience probably won't notice the difference. It is true that the resulting painting depicts a new image that we have not seen in the artist's other works, but the result is simply a "collage" of what the artist has created and collected in one painting. The resulting picture is a "replica" of human labor, even if it is an amazing result.

Yes, modern AI systems essentially resemble a college student who needs to submit a term paper to a picky teacher so that the latter does not find obvious plagiarism in his work. Depending on his abilities, the student can find from 3 to hundreds of references to different sources that correspond to the topic of his coursework and compile the text. In this case, the level of "novelty" of the student's work will be determined by his ability to rephrase the found thoughts of others in his own words.

The Dark Factory Portraits, the first exhibition by artists Rob and Nick Carter, was exhibited at Ben Brown Fine Arts, London, in February 2020. The artists finally presented their project, which they had been working on for several years, to a wide audience. The artists collaborated with a team of cutting-edge programmers and visual effects specialists. Visitors to the gallery will be able to see the famous KUKA robotic arm in action, drawing a new generation of portraits according to our instructions. Rob and Nick comment on the title of the project: "We called them Dark Factory Portraits as a reference to the slightly creepy reality of 'light production', where factories can function in the dark because robotic systems don't need to 'see' what they're doing" [22].

4.2. AI in sculpture

The use of robots in sculpture, bust sculpture, and bass carving has also become widespread. Figures, human figures, portraits, busts or bas-reliefs carved by robots from various materials are first digitized with a scanner. Once entered the database, various additions are made as needed. Such works can be successful in the production of new works of art and products, as well as in restoration work. New Age Robotics, a Canadian company that offers a variety of robotic services, assisted in the renovation of the Canadian Parliament Building, the construction of which began in 1859. One of the several bas-reliefs on the façade of the building was re-carved and restored with the help of an additional KUKA KR 120 R2700 extra HA robot. We believe that the use of robots in restoration and restoration work is a great initiative, however, the creativity of both the algorithm and the robot is out of the question [23].

4.3. AI in music

There are many examples of the use of artificial intelligence in music along with the visual arts. Several algorithms and computer programs have been developed in music, and in 2018, the artist SKYGGE (Benoit Carré), together with other musicians, created his first album "Hello World" using artificial intelligence. The Sony Flow Machines project was used to create the album. Flow Machines is an online AI tool for composing music. Using this system, creators can compose melodies in many different styles they want to achieve based on their own musical rules created through various musical analysis. It is a tool for the creator to get inspiration and ideas so that their creativity is greatly expanded. Jean-Michel Jarre, a pioneer of electronic music, is particularly interested in the development of artificial intelligence and is currently working with Sony on a new album using the Flow Machines system. In an interview with the BBC's Mark Savage, in November 2019, the composer stated: "The advent of AI is a revolution... For the first time, we're merging the creative process with the machine" [24].

A few high-tech manufacturing companies are currently dedicating resources to creating software for artists using AI technology. Examples include LANDR for mastering, music production, and sales, IBM and Sony for musical composition, and Google's Project Magenta for sound and music synthesis [25].

Another project to create music using artificial intelligence is called AIVA (Artificial Intelligence Virtual Artist). AIVA is an AI capable of creating emotional soundtracks for movies, video games, commercials, and any type of entertainment content. The Aiva Technologies, AIVA project was founded in February 2016 by Pierre Barrault, Denis Stephan, Arnaud Decker and Vincent Barrault. The source of his information is the rich history of some 30,000 scores of musical compositions written by composers such as Beethoven, Mozart, Bach, etc. Learning from significant contributors to music history has helped AIVA grasp the concepts of music theory and understand the art of musical composition. In addition, it helped AIVA "create a mathematical model of what music is. This model is then used by Aiva to write completely unique music" [26].

One of the latest and most incredible moves in the application of artificial intelligence in musical performance is the Yamaha project, where world-famous dancer Kaiji Moriyama controls the piano through dance moves. A concert presentation of the project titled "Mai Hi Ten Yu" took place in Japan on November 22, 2017 and was sponsored by the Tokyo University of the Arts. The original system that Yamaha uses turns human movements into musical expression using artificial intelligence technology as a technical collaboration for performance. During the concert, the dancer was accompanied by the Berlin Philharmonic Sharon Ensemble [26].

As can be seen from the above, the artificial intelligence systems used in music as well as in the visual arts are being developed on a historical basis. Algorithms based on extensive materials and sources collected throughout the history of both music and visual arts, assimilate information from a database and reproduce the information in a new form and content. Modern systems no longer just play the role of tools with methods that they use, they enter the "creative" stage. However, an analysis of existing projects shows that there is no completely independent creative system, and we assume that such systems are unlikely to be created soon.

4.4. AI in Stage and Vocal Arts

The stage performance of robots has gained popularity in recent years. KUKA AG is one of the most important manufacturers of industrial robots and factory automation solutions. The robots produced by the company are used in creativity and experimental projects in various fields of art. KUKA AG robots often perform at various modern concerts and shows. The performance of the Bruckner Orchestra in Linz at the 2018 Grand Concert Evening of the Ars Electronica Festival was accompanied by the KUKA KR 600 industrial robot and aroused great interest. The robot was programmed and choreographed by a team of several people led by Austrian engineer Johannes Braumann. Johannes Braumann is one of KUKA's leading experts in the development of software tools for parametric control of robots. Such performances are usually possible thanks to robotic movements pre-programmed for every second. In 2019, a dance show was prepared at the same festival featuring five KUKA robots moving in sync with milliseconds based on motion capture data. Johannes Braumann, the robot programming engineer, writes on his Facebook page.

Another interesting stage performance with robots was performed by Huang Yi, a Taiwanese dancer, choreographer, and inventor. He achieved a very interesting stage design and mesmerizing show dances with the KUKA industrial robot, which he programmed. And he explains his dance with the robots: "Dancing face-to-face with the KUKA robot is like looking at my face in the mirror... I think I've found the key to turning human emotions into robots."

The New York Times wrote about the Yi project: "These strong emotional currents flow through Huang Yi & KUKA, making it more than just a fun exercise in combining dance and technology [27].

We can see the invaluable work of various artists, as well as computer engineers and programming specialists, in the creation of the above-mentioned projects. The influence of the dancer and artist on coding and algorithmic systems in such projects is undeniable. A specialist in creating software for a robot that dances gracefully on stage cannot achieve a highly artistic solution without the collaboration of a choreographer. A heavy industrial robot is controlled by a

certain amount of coding, but coding is taught by a human artist. Artificial intelligence systems used in both music and visual arts are created with the help of musicians and artists. This is the moment when the fact of intertwining information technology with art appears. In this way, art becomes technological, and technology becomes artistic and aesthetic.

Sofiane Audry, Assistant Professor of New Media at the School of Computing and Information Sciences at the University of Maine, Orono, USA, and John Ippolito, an artist and new media scholar, came to an interesting conclusion in their article "Can Artificial Intelligence Make Art Without Artists?": "Art is not a measurable fact like the temperature of the water in a bathtub; This is an interpreted state, such as warm or cold bath water. If people continue to identify motives for creative action, artists will continue to exist as social constructs. So, the question we started with is, can machines be artists? - That's the wrong question. Instead, we should ask what roles machine art leaves for artists – imaginary or real, flesh or silicon – and the viewers who represent them" [28].

In May 2016, during the second semi-final of the Eurovision Song Contest, three KUKA's KR16-3 series industrial robots and three dancers staged an interesting and attractive "Man vs. Machine" performance. The dances were choreographed by Fredrik Behnke Reidman, a well-known Swedish choreographer. Man vs. Interval Machine, co-produced by F.B. Rydman and KUKA engineers saw millions of live TV viewers in addition to the thousands of viewers in the hall. "My idea was to test whether humans could be affected by the movements and behaviour of robots. In fact, the machines were able to evoke feelings in the audience. This was revealed by the massive reaction of the audience, who told us that the show was amazing," says B. Readman about the project.

It should also be noted that choreographer Fredrik Behnke Rydman later performed with the ABB industrial robot. The premiere of the innovative project took place in September 2018 in Stockholm, Sweden. Behnke prepared an interesting and very aesthetic dance performance with the IRB 6620, a 900-kilogram industrial robot from ABB. The IRB 6620 is one of ABB's largest, toughest and heaviest industrial robots commonly found in heavy industry. I must emphasize that the delicate dance of the lifeless, soulless machine weighing 900 kg on stage is incredibly impressive and eye-catching. This is a prime example of how robots can convey certain feelings and emotions to the audience [29].

Robots performed at the 2019 Eurovision Song Contest in Tel Aviv, Israel, as well as during a stage show by Azerbaijani singer Chingiz Mustafayev. Front Pictures' creative studio worked with an international team on design and production and created an innovative stage show. During the high-tech laser show, two robots accompanied Chingiz Mustafayev on stage. The robots performing at the show were created by KUKA and presented by PROFI Innovations, which combines creativity and high technology. The performance of the robots accompanying Chingiz on stage, as well as the laser and hologram show, made an impression on the audience.

In September 2017, at the final concert of the First International Robotics Festival in Pisa, Italy, YuMi, a robot developed by the Swiss firm ABB, conducted an entire orchestra. The robot was trained by Andrea Colombini, conductor of the Lucca Philharmonic Orchestra. Teaching YuMi to play six minutes of music took him 17 hours of work. Andrea Colombini praised the robotic conductor YuMi. However, conductor A. Columbini believes that robots cannot replace humans because they do not have the ability to improvise. Any slight change in tempo during a concert would have been bad luck for the robot (Reuters Employees).

During his speech at the traditional World Economic Forum in Davos in 2018, Jack Ma, the former executive chairman of the well-known Alibaba Group, made some interesting remarks about robotics and the problems that robots could cause in human life in the future. Asked about the education we can give to future generations at a time when the robot industry is developing rapidly, Jack Ma said that future generations will find it difficult to compete with robots. "Robots are rapidly squeezing humans in all areas. The education we can give our children cannot be limited to knowledge. We must ensure that our children acquire unique knowledge. The ability to work in a team, trust, values, mutual respect, and the ability to think independently are the main

parts of this knowledge. We need to teach our children more about music and painting. Because art teaches people to think differently" [30].

V. Conclusion

The confrontation between humans and machines is already known in many areas. The confrontation between the super chess player and the world champion G. Kasparov at the end of the last century is a well-known example of the struggle between the human brain and artificial intelligence. The first confrontation between the "Deep Blue" computer, introduced by IBM and G. Kasparov in 1996, was won by a human. But a year later, in New York, because of 6 games, a supercomputer defeats the human mind. This event is the first example of human failure on a computer. Since 1996, chess systems have been developed and released in many versions. Stockfish, currently one of the most advanced and advanced chess systems designed for various desktop and mobile platforms.

Professor Stephen Hawking, one of the most brilliant minds of our time, believes that artificial intelligence is dangerous: "Artificial intelligence could mean the end of the human race, which AI will take off on its own, and redesign itself at an ever-increasing rate. Humans, who are constrained by slow biological evolution, could not compete and would be replaced" [31].

Elon Musk, the co-founder of aerospace technology company Space X, has repeatedly expressed his concerns about artificial intelligence: "I think we have to be very careful about developing artificial intelligence" [32]. It should also be noted that E. Musk is one of the founders of Open AI, a research company that studies artificial intelligence. The main goal of the company is written on the official website: "Our mission is to ensure that artificial intelligence benefits all of humanity."

Computers, various digital devices, or robots are products of human intelligence. We should not compare machines to humans. It would be absurd to compare a race car produced with the help of modern technological innovations to an athlete who breaks the most incredible running records. Technologies such as mapping in theater and other performing arts, as well as motion capture in film, etc. They give the human creator new tools of creativity without replacing him.

It is impossible to compare Raphael's great canvases with an image compiled by a neural network, copying the artist's style and artistic techniques. This is ultimately an imitation, not a creation of something new. The desire of the creators of AI systems to show that their brainchild is no worse than the greatest creators in the history of mankind is understandable, but to evaluate "machine art", other criteria are needed that are different from the criteria for evaluating human creativity. Here we can compare the complexity of the algorithm, the amount of database and knowledge to be processed, the speed of image generation, the degree of correspondence of the result obtained to the expected one, the emotional impact on the audience, etc. Yes, a computer program "beat" a person at chess and even at Go, but this happened only after a significant increase in the speed of computers and the expansion of databases used for training. The machine simply goes through the options for the development of the position that has arisen on the board faster, it does not know fatigue, it does not have emotional experiences. Therefore, it is correct to compare algorithm with algorithm, program with program.

We believe that different types of machines, robots and equipment, in general, artificial intelligence, can produce a product of art, i.e. it can be a producer of a product of art, but production does not mean creativity.

In addition, it is the human who programs the robots to perform specific tasks, that is, a machine programmed to dance cannot proceed to improvisations beyond coding during the performance. A machine programmed to draw is incapable of creating a sculpture. A robot that wins the Robot Painting competition works in a way that is designed by human intelligence and cannot create a new one.

It is not yet possible to say for sure that modern neural networks are the artificial intelligence that humanity has been waiting for, although they are able to pass the Turing test relatively easily, as mentioned earlier.

The incredibly rapid pace of high-tech development makes it difficult to predict the future. Nowadays, a variety of digital hardware, software, algorithms, and coding, including AI systems, are just tools in the hands of humans. They are in themselves the crowning achievement of the human mind. The risk of complete dehumanization of the creative fields of human activity can currently be assessed as low, but the fact that this risk is identified and difficult to predict requires close attention and study.

Man's system of ethical and moral norms does not apply to machines, even those capable of self-learning. AI, when it does emerge, will inevitably develop its own ethics and its own morality. Most likely, these norms will be very different from the human ones since the goals and meanings of the existence of a human and a "rational robot" are different.

If humanity allows the uncontrolled creation of AI equal to and superior to human intelligence, there will be risks of the coexistence of robots and humans on the same planet. A robot servant and assistant obeying Isaac Asimov's Three Laws of Robotics The first law categorically forbids a robot to harm people, the second commands a robot to obey humans until it contradicts the first law, and finally, the third law commands a robot to protect its life without violating the first two) can become an enemy if it learns to interpret the concept of harm to a person on its own, especially since the second law does not forbid a robot to be independent in this matter.

The appeals of modern thinkers, who understand the possibility of such a development of events, are aimed primarily at the development of a code of human behavior in relation to the devices he creates and responsibility for the results of their use. AI must become and remain an assistant to humans in their activities, otherwise, it can become an enemy that does not know compassion, pity and love. However, "This age thinks better of a hides fool, Than of a threadbare saint in wisdom's school" ["Old Fortunatus", Thomas Dekker].

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