A Good Human-machine Collaboration Enhances the Quality of Artificial Intelligence Artworks

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Abstract:The rapid development of artificial intelligence technology has brought new opportunities for the development of art, opening up a new era of art development. Expanding the boundaries of art and bringing a new artistic experience to the audience will inevitably have a profound impact. Users and artificial intelligence are two important subjects in artificial intelligence art creation, and they are new employees of artificial intelligence art enterprises. This article takes artificial intelligence painting as an example, and through a survey of users of artificial intelligence art platforms, it is concluded that good human-machine collaboration can improve the quality of artificial intelligence art works. Therefore, it is necessary to further enhance the level of human-machine collaboration, leverage their respective advantages, and collaborate in different areas.It is crucial not only to focus on the collaborative work between users and AI but also to emphasize the emotional collaboration between users and AI.

Keywords: AI Art; Virtual Employee; Human-machine Collaboration

Introduction

1.1 Introduction to AI Art and the creation subjects

Artificial Intelligence Art (AI Art) is also known as Generative Art, or Computer -Generated Art, or Algorithmic Art. Art and Artificial Intelligence have been intertwined for years; however, the emergence of AI as an integrated part of society has changed the way we understand and interact with it. AI has become a powerful tool for creativity and innovation that can be used to create art.

Elgammal et.al.(2017) have put forth recommendations to enhance the objective of an art generation system, with the aim of fostering creativity by maximizing deviation from established styles while minimizing deviation from art distribution. In order to evaluate the effectiveness of these modifications, They conducted a series of experiments comparing human subjects' responses to art generated by the system with their responses to art created by professional artists. Astonishingly, the results indicate that human subjects were unable to distinguish between the art generated by the

proposed system and that produced by contemporary artists showcased at prestigious art fairs. Not only that, but the generated images were even rated higher on various scales by the human participants. These findings shed light on the remarkable potential of the proposed system in generating high-quality art that is practically indistinguishable from works crafted by human hands.

Artificial intelligence has made significant contributions to the field of visual arts in the past years. With advancements in deep learning and computer vision algorithms, AI-generated artworks and paintings have gained widespread attention. These AI algorithms are capable of analyzing existing artistic styles, patterns, and compositions, and then creating original pieces of art that mimic the works of famous artists or explore entirely new genres.

In addition to AI-generated art, artificial intelligence has also become a valuable tool in assisting design and creation processes in architecture and fashion. Through the use of AI algorithms, architects and designers can generate complex and innovative designs that consider various parameters such as structural integrity, energy efficiency, and aesthetic appeal. Similarly, fashion designers can leverage AI to explore new combinations of fabrics, colors, and patterns, leading to unique and cutting-edge designs.

Moreover, artificial intelligence has revolutionized image and video manipulation in the field of photography and movies. AI-powered algorithms can enhance images, remove noise, and even manipulate the content of photographs. This technology has proven useful not only for professional photographers but also for enthusiasts who wish to improve the quality of their photos. In the film industry, AI algorithms are being used to create stunning visual effects and realistic CGI (computer -generated imagery), enabling filmmakers to bring their creative visions to life in ways that were previously unimaginable.

The emergence of AI in the arts has substantially impacted traditional artistic processes and practices. Artists are now exploring AI-generated works, collaborating with AI algorithms, and utilizing AI-based tools and software to enhance their artistic creations. This symbiotic relationship between art and technology has the potential to redefine artistic expression and challenge conventional ideas of creativity.
It is important to note that the term “AI art” is not clearly defined by any one definition or set of pa rameters. Some see AI art as a autonomously created artwork, while others see it as artwork genera ted from AI-driven algorithms or processes. In both cases, AI technology is used in the creation of art in some capacity. AI art is the use of AI algorithms to generate works of art and aesthetic experi ences that engage viewers in novel ways.

Hertzmann A.(2018) explores the possibility of computers, through the use of Artificial Intelligence (AI), being capable of creating art. To gain a deeper understanding of this topic, it is

important to examine the history of technologies that have automated certain aspects of art, such as photography and animation. In both cases, there was initially skepticism and resistance towards these technologies. However, they ultimately opened up new doors and provided artists with fresh creative opportunities. Later, Hertzmann A. (2022) continued to examine this issue from a historical perspective in his blog. Throughout history, the definition of art has undergone tremendous transformations as different eras brought forth new perspectives. Technological advancements have played a significant role in shaping these shifts. It was not until the societal changes triggered by the Industrial Revolution that the distinct concepts of "art" and "artist" truly emerged. The introduction of photography, for instance, automated processes that were previously believed to be exclusive to human creativity and expertise. This revolutionary development prompted a reevaluation of the very nature of art itself, ultimately giving rise to the Modern Art movement. The influence of technology on art can also be seen in the evolution of hip-hop. This genre of music owes its origins, in part, to the advent of dual turntables with faders. Harnessing the power of this technology, hip-hop artists heavily relied on remixing and repurposing existing music, crafting something entirely new and unrecognizable. This creative process shed light on the significance of remixing in art, extending beyond music to literary works like those of Homer and Shakespeare. It challenged simplistic notions of ownership and copyright, emphasizing the idea that "Everything is a remix. " Now, we find ourselves facing yet another transformative era with the emergence of AI-generated art. As algorithms demonstrate capabilities once attributed solely to human creativity, we are forced to reassess our understanding of the artist's role and the essence of human creativity.

There has been ongoing debate about the creator of artificial intelligence art. Some argue that the main creator is the artificial intelligence itself, while others believe it is the engineers who develop the artificial intelligence algorithms.In 2017, at the **F**uture Investment Initiative in Saudi Arabia, So phia, an AI robot designed by Hong Kong-based company Hanson Robotics, was granted Saudi Ara bian citizenship, becoming the first robot in history to receive citizenship. In the same year, Microso ft's AI poet Xiaoice published a poetry collection titled "Sunshine Misses Windows" In 2019, the AI artist Xia Yu Bing graduated from the Central Academy of **F**ine Arts and held a solo exhibition call ed "Alternative Worlds," showcasing hundreds of diverse painting works. In 2020, Xiaoice graduate d from the Music Engineering Department of the Shanghai Conservatory of Music and was honored as a "distinguished graduate." In 2021, the AI artist Hua Zhi Bing entered the Computer Science De partment at Tsinghua University. Xiaoice, Xia Yu Bing, and Hua Zhi Bing are all AI initiatives laun ched by Microsoft, each assigned with slightly different designations, such as poet or student, contri buting to their respective "personalities."In 2022, Denmark registered and established The Synthetic Party, led by an AI chatbot called Leader Lars. The Synthetic Party has emerged as an exciting forc e in Danish politics, challenging the status quo and offering a new vision for the future. AI is even b eing given the "candidate" personality. These series of phenomena indicate that AI is gradually deve loping into independent entities with their own personalities.

In fact, users also play an important role in the creation of AI Art. Consequently, the author believes that users and artificial intelligence are the common subjects of artistic intelligence art creation. Human resource management in AI art platforms not only includes natural human users but also corporations AI into the management scope as both entities are the primary focus of platform's human resource management.

In human resource management, users who participate in production are referred to as virtual employees. As a non natural person, artificial intelligence is also a virtual employee in fact.Human resource management in AI art platforms revolves around "virtual employees," with users and artificial intelligence as the main entities.

1.2 Statement of the Problem

Currently, it is widely believed that the quality of artificial intelligence artwork primarily depends on the level of artificial intelligence technology, seemingly ignoring the role of users in the process. In reality, users remain a vital component in the creation of artificial intelligence art, playing a significant role in tasks such as instruction writing.

Others may perceive that users simply need to input instructions for the artificial intelligence software to generate artwork. However, this casual approach of inputting instructions often yields unintended results. To effectively collaborate with artificial intelligence, users must first address the issue of communication between the two parties. Natural language processing technology serves as a bridge for communication between humans and machines. Therefore, users not only need to understand the principles of artificial intelligence technology but also possess skills in effectively communicating with the artificial intelligence.

Questions such as the specific role users play in human-machine collaboration, how users and artificial intelligence cooperate, the extent of user contribution, and the impact of user-artificial intelligence collaboration on the quality of artificial intelligence all require further research.

2.Research focus

2.1 To study the collaborative relationship between users and AI

The division of labor between users and artificial intelligence is the first issue that needs to be solved, and the cooperation between users and artificial intelligence needs to clarify their respective advantages and capabilities. Artificial intelligence undoubtedly has advantages in computing, analyzing, and processing large amounts of data, while humans excel in emotions, creativity, and flexibility. Therefore, in cooperation, the computing, analysis, and processing capabilities of artificial intelligence should be fully utilized, making it an intelligent assistant for users and

providing them with more efficient and accurate services. Users should fully utilize their emotions, subjective initiative, and decision-making abilities, so that artificial intelligence can better understand and meet their needs. Collaboration between users and artificial intelligence requires establishing good communication and feedback mechanisms. Communication is the cornerstone of cooperation, and only through effective communication can we reach consensus and understand the other party's intentions.

2.2 To study the impact of collaboration between users and AI on the quality of AI art works

The interaction between users and artificial intelligence will play a collaborative role and have a significant impact on the quality of generated works.The level of collaboration between users and artificial intelligence can also affect the quality of generated works. Only by mutual understanding, cooperation, and establishing a good cooperative relationship between users and artificial intelligence can we promote the improvement of the quality of artificial intelligence art works. Users need to convey their creativity and intentions to artificial intelligence through clear and clear language. Users should describe their desired work features, emotional expressions, style requirements, etc. in as much detail as possible to ensure that artificial intelligence can accurately capture user needs and create. Enable it to more accurately reflect user expectations during the process of generating works.

Artificial intelligence can correctly understand user intentions, and it also requires a high level of semantic understanding and reasoning ability to accurately interpret user intentions. Artificial intelligence should be able to accurately understand the meaning that users want to express and transform it into corresponding artistic elements by analyzing user instructions, sentence structure, semantic logic, and other information. This requires artificial intelligence to fully consider the diversity and flexibility of different language expressions in the training and optimization process, in order to better meet the needs of users in their creations. At the same time, artificial intelligence also needs to leverage its technological advantages to create unexpected and surprising works, enabling users to obtain a more satisfactory creative experience.

3.Literature review

3.1 Concept

Virtual Employees

As the times continue to evolve, the concept of virtual employees is also gradually evolving. In general, virtual employees can be divided into the following three categories. According to Liu, Z., Zhang, J., & Liu, H.(2015), virtual employees are those who can provide real work for companies

without the need for physical office space and equipment. They can essentially be seen as external human resources for organizations, teams, or individuals, providing services. The emergence of virtual employees brings new challenges and changes to human resource management in companies . In terms of working methods, managers can adopt flexible working hours to manage virtual employees, allowing them to arrange their own work schedules and processes without direct supervision. This flexible and efficient management style enables virtual employees to better demonstrate their work potential and creativity. **F**rom the perspective of employee training, manage rs usually do not need to spend a lot of time and effort on training virtual employees because they al ready have the necessary skills, knowledge, and experience. Virtual employees can immediately star t contributing value to the company. Regarding benefits and compensation, apart from negotiated sa laries, virtual employees generally do not enjoy social security benefits such as insurance, paid leav e, or medical expenses. This may affect the welfare needs of some employees, requiring careful con sideration and balance in the employment relationship. The presence of virtual employees brings fle xibility and efficiency enhancement to companies, but it also requires managers to put extra efforts i nto communication, coordination, and supervision to ensure collaborative work and efficient operati ons with virtual employees. Therefore, establishing good communication channels and team collabo ration mechanisms are particularly important. Compared to traditional employment relationships, th e employment relationship between companies and virtual employees is more similar to an order-ba sed cooperation model. Based on the needs of the company, virtual employees complete assigned ta sks but are not restricted from accepting similar or different types of work from other companies. W ithin the virtual employees' capabilities, they have the ability to take on multiple task orders simulta neously. This flexibility and diversity make virtual employees highly sought after by companies.

Another viewpoint argues that virtual employees are virtual labor provided through digital platforms such as the Internet. According to this perspective, virtual employees are essentially an automated office system implemented through computer programs or artificial intelligence technology. Unlike traditional employees, virtual employees do not need to physically exist in an office and do not require traditional recruitment, training, and management processes. They can remotely complete tasks and projects through online platforms from different geographic locations, providing various services to employers. The emergence of this virtual workforce significantly reduces the human resource costs for companies. Compared to the traditional employee model, the arrival of virtual employees can help companies reduce human resource costs and meet the manpower needs of companies flexibly. Traditional employee models require companies to provide office space, equipment, and daily expenses, all of which incur high fixed costs. In the virtual employee model, companies can greatly reduce these costs. Virtual office setups do not require large amounts of paper and energy consumption, effectively reducing the depletion of natural resources and minimizing negative environmental impacts. The presence of virtual employees has also sparked innovations in work arrangements. With the rapid development of

technology, more and more tasks can be automated through computer programs or artificial intelligence technology. Virtual employees can learn and mimic human behavior and thought processes to automatically perform various tasks. Depending on the application in different fields, virtual employees can handle various jobs such as software development, copywriting, data analysis, and customer service. The emergence of this new type of workforce enables companies to better adapt to market demands and improve work efficiency. The presence of virtual employees can provide support for a company's sustainable development and aligns with modern society's pursuit of sustainability.

The third viewpoint suggests that digital humans are also emerging as a new type of virtual employees. In the rapidly evolving landscape of modern technology, the concept of the "digital human" has emerged as a fascinating area of exploration. As advancements in artificial intelligence (AI), virtual reality (VR), and augmented reality (AR) continue to push the boundaries of what is possible, the line between the digital and physical realms becomes increasingly blurred. The digital human represents a convergence of technology and humanity, offering the potential for new experiences, insights, and challenges. The Digital Age has witnessed the rapid advancement of technology and its impact on various aspects of our lives. One significant outcome of this progression is the emergence of "Digital Humans" or "Virtual Humans," also known as "Digital Beings." As the name suggests, these beings are entirely digital entities created using cutting-edge technologies such as artificial intelligence (AI) and computer graphics. Digital Humans are designed to resemble and interact like their human counterparts. They can display emotions, engage in conversations, and even mimic human-like movements. These virtual beings are becoming increasingly realistic with the help of AI algorithms, which allows them to learn and adapt their behavior based on user interactions. This includes recognizing facial expressions, understanding voice commands, and responding intelligently to questions. The idea of the digital human can be traced back to early attempts at creating virtual beings in video games and simulations. However, recent advancements in AI and computer graphics have propelled this concept to new heights. Today, digital humans are not only visually realistic but also capable of interacting with users in sophisticated ways. Creating a believable digital human involves a multidisciplinary approach that encompasses AI, computer graphics, neuroscience, psychology, and more. To achieve a high level of realism, developers need to tackle the challenges of modeling realistic facial expressions, body movements, and even emotions. They also need to develop sophisticated natural language processing algorithms to enable intelligent conversations and responses.The applications of digital humans are vast and diverse. In the entertainment industry, digital actors and virtual influencers are already making their mark. With the ability to create lifelike characters, movie directors and game developers can bring new stories and experiences to life. Virtual influencers, on the other hand, are gaining popularity on social media platforms, attracting millions of followers and even partnering with brands for endorsements.

3.2 Creativity Theory

Creativity theory refers to the study and understanding of the phenomenon of creativity. It is a multidisciplinary field that incorporates insights from psychology, neuroscience, sociology, and philosophy. It seeks to understand and explain the cognitive processes behind creative thinking and problem-solving. It explores how individuals generate, develop, and evaluate novel ideas, as well as the factors that influence creative outcomes. It explores the processes, characteristics, and factors that contribute to the generation of new ideas, solutions, and artistic expressions.

Creativity has long been a focus of the organizational research agenda. Numerous theories have been proposed to explain the sources and processes of creativity, both in terms of what stimulates it and what impediments may inhibit it. There are several major theories on creativity, including:

The Four-stage Model of creativity

One prominent theory in the field is the four-stage model of creativity, proposed by Graham Wallas in 1926. This model suggests that the creative process involves four stages: preparation, incubation, illumination, and verification. During the preparation stage, individuals gather information and knowledge relevant to the problem at hand. In the incubation stage, the unconscious mind works on the problem, allowing for new connections and insights to emerge. The illumination stage is characterized by sudden insight or the "aha" moment, where the solution to the problem becomes apparent. Lastly, in the verification stage, individuals evaluate and refine their ideas to ensure their feasibility and effectiveness. These four stages are not always linear and can occur in a non-linear, iterative fashion. Creative thinkers often move back and forth between the stages, constantly refining and building upon their ideas. Each stage plays a vital role in nurturing creativity and allowing for the generation of unique insights. By immersing oneself in the subject matter, giving time for reflection, embracing unexpected breakthroughs, and critically evaluating and refining ideas, individuals can unlock their creative abilities and make meaningful contributions in their respective fields.

Componential Model of Creativity

The componential model of creativity is a theoretical framework that seeks to understand the cognitive processes and factors involved in creative thinking and problem-solving. It was proposed by Teresa Amabile, a psychologist known for her work on creativity. According to the componential model, creativity is influenced by three interrelated components: domain-relevant skills, creativity-relevant processes, and intrinsic task motivation. Domain-relevant skills refer to the knowledge, expertise, and technical abilities that an individual possesses in a particular domain. This component involves having a deep understanding of a specific field or subject matter, which provides the foundation for creative thinking. For example, a musician who has mastered their instr

ument would have the necessary domain-relevant skills to create innovative compositions. Creativity-relevant processes involve the mental activities and strategies used to generate creative ideas and solve problems. These processes include cognitive flexibility, divergent thinking, associative thinking, and the ability to make novel connections between different concepts. Individuals who excel in these processes are more likely to come up with original and groundbreaking ideas. Intrinsic task motivation refers to the inherent enjoyment, interest, and curiosity that individuals have in engaging with a creative task. When someone is intrinsically motivated, they are driven by their own internal rewards, such as the satisfaction of creating something new or solving a challenging problem. This component is crucial because it enhances persistence, focus, and dedication to the creative process. The componential model of creativity emphasizes the dynamic interaction between these three components. It suggests that creativity is not solely determined by innate talent but can be developed and enhanced through deliberate practice, exposure to diverse experiences, and a supportive environment that fosters intrinsic motivation. In addition to these three components, the componential model of creativity also considers various contextual factors that can influence the creative process, such as external support , social environment, and organizational culture.

The 4P Model of Creativity

The 4P Model of creativity by American psychologist James C. Rhodes refers to a theoretical model of creativity. The model includes the following four elements: Person: Refers to individuals or teams with creative abilities. In the process of creativity, an individual's traits, abilities, motivation, and attitudes all influence the development of creativity. Each person's creativity is unique and influenced by their personal characteristics and background. Process: Creativity is a dynamic process that involves how individuals generate new and valuable ideas, concepts, or solutions. This process includes problem definition, information gathering, thinking, associating, evaluating, and ultimately, creative output. A well-designed creativity process can help enhance the effectiveness of creativity. Product: Represents the output of creativity, including creative ideas and innovative outcomes. Products can be inventions, articles, artworks, business strategies, and more. The value of a product depends on its impact on society, the economy, or individuals. Press: Refers to the environmental conditions in which creativity occurs. The creative environment can include physical , social, and cultural aspects, which can either facilitate or hinder the development of creativity. The creative environment includes supportive interpersonal relationships, an open organizational culture, accessibility to resources.

4C Model of Creativity

One prominent theory in the field of Creativity Theory is the **F**our C Model by psychologist and res earcher James Kaufman. This model posits that creativity involves four key components: mini-c, little-c, pro-c, and big-C. Mini-c refers to everyday creativity that occurs in an individual's day-to-day life, such as coming up with a new recipe or finding a creative solution to a problem at work.

Little-c represents creative accomplishments that are recognized within a specific domain, such as writing a memorable poem or painting a beautiful picture. Pro-c refers to creativity demonstrated by individuals who have achieved expertise in a particular domain, such as professional artists or scientists. **F**inally, big-C refers to transformative creativity that has a significant impact on a larger s cale, such as groundbreaking scientific discoveries or revolutionary works of art. Creativity Theory also emphasizes the importance of both divergent thinking and convergent thinking in the creative p rocess. Divergent thinking involves generating multiple unique ideas and possibilities, while conver gent thinking involves evaluating and selecting the most promising ideas for further development. B oth types of thinking are seen as crucial for fostering creativity. Various factors can influence creati vity, including individual traits, environmental factors, and the interaction between the two. **F**or exa mple, personality traits such as openness to experience, curiosity, and willingness to take risks are o ften associated with higher levels of creativity. Additionally, environmental factors such as social su pport, access to resources, and exposure to diverse experiences can also play a role in stimulating an d nurturing creativity.

4.Methods

4.1 Questionnaire Survey Method

This study primarily adopted a random sampling method for research purposes. The widely recognized Chinese online survey platform, Wenjuanxing (https://www.wjx.cn/), was used to invite eligible target participants from its own sample database to complete the questionnaire. Wenjuanxing has over 2.6 million samples and can precisely target participants based on various sample attributes, such as gender, age, region, occupation, and industry. To ensure the authenticity and validity of the samples, methods such as setting screening pages and using trap questions during the survey were employed to filter out ineligible respondents. Additionally, manual inspections were conducted to further verify the samples.

4.2 Data collection

A total of 7071 survey questionnaires were distributed and 515 were collected. After screening, 319 of them were valid and 196 were invalid.

5.Results

5.1Users Perception of AI Technology

Among the users, 41.38% have a relatively good understanding of artificial intelligence (AI) technology, 42.95% have a general understanding, and only 5.02% have a very deep understanding. **F**rom this data, it can be seen that the level of user cognition regarding AI technology still needs fu rther improvement.

Although a considerable number of users have a basic understanding of the principles behind AI-generated artworks, their understanding of the core technologies behind it is not deep enough. However, this result does not imply that users are disinterested in or have a low acceptance of AI technology. On the contrary, it reflects the widespread popularity of AI technology among the general public and the wide range of its applications.

AI technology has begun to permeate various aspects of daily life, bringing convenience and innovation to people. Although users may not fully grasp the core principles of AI technology, they have a certain degree of understanding of its basic operations and application methods. This general awareness is understandable, as the development and application of AI in the field of technology are progressing at an unprecedented pace.

The core technologies of AI include machine learning, deep learning, natural language processing, etc., which involve complex algorithms and models. It is not easy for non-professionals to delve into these technologies and gain a deep understanding. This also reflects the fact that AI is an emerging discipline that requires specialized knowledge and continuous learning.

However, over time and with technological advancements, more and more users may develop a strong interest in AI technology and proactively seek to learn related knowledge. Overall, although users have a general level of awareness about AI technology, it is important to note that the core technologies behind AI are relatively complex, requiring more learning and in-depth research to achieve a higher level of understanding. Encouraging users to maintain their interest in AI technology and actively participate in relevant learning and discussions will further enhance their level of cognitive understanding in this field.

5.2 Users Collaboration with AI

In terms of division of labor, 56.11% of users believe that "users make requests and AI is responsible for implementation," while 32.29% believe that "users are responsible for creativity and AI is responsible for technology." Only 0.94% of users are unclear about the division of responsibilities, indicating a clear division of labor between the two.
During the collaboration process, 26.02% of users find the cooperation between users and AI " mutually coordinated and very smooth," while 57.37% feel that it is "dependent on luck, sometimes smooth and sometimes not." 10.34% of users claim to understand AI, while only 1.25% do not. 3. 45% of users believe that AI understands them, while only 1.57% feel that AI does not understand them.

Regarding the contribution of AI-generated artworks, 57.37% of users believe that AI provides significant assistance, while 20.38% feel that AI provides great assistance. On the other hand,

42.63% of users believe they make a significant contribution in the creation process of AI-generated artworks, while 37.62% believe their contribution is average. 59.87% of users consider AI's contribution as significant, and 20.06% believe it is very significant.

When comparing contributions, 44.83% believe that "sometimes it's the user, and sometimes it's AI, " while 21.94% think the user's contribution is greater, and 24.14% believe AI's contribution is greater.

Based on the above data, it can be concluded that there are still challenges and areas for improvement in the collaboration between users and AI. While there is a clear division of labor, the collaboration process is uncertain, with varying degrees of success. Relying on luck is not a reliable approach to collaboration. The results of the collaboration demonstrate the important role of AI in the creation process of artworks and are positively acknowledged by users. However, users also recognize their own indispensable contribution to the creative process, which complements AI. This data reflects the effectiveness of AI applications in the field of artistic creation, but also highlights the need for further development of explainable AI. Through explainable AI, people can better understand the rules, knowledge, and reasoning processes on which AI relies during the creative process. Such explanations can help users understand the process and results of AI-generated artworks, such as using visualization techniques to explain the process of AI painting and provide insights into aesthetic principles and values in art creation. The application of explainable AI will contribute to building trust and improving cooperation between users and AI.

6.Discussion

The Emotion of Human-machine Collaboration

Artificial intelligence in the field of art creation has always been a topic of controversy, with one major issue being the lack of emotion. Traditional belief suggests that AI cannot comprehend or express human emotions, resulting in emotionally void creations. Emotion is an important manifestation of human psychological activity, representing subjective reactions to external stimuli and internal experiences. It is closely related to physiological changes, cognitive processes, and individual characteristics. Emotions can be expressed through various emotional states such as joy, anger, sorrow, and happiness, serving as a bridge for human connection and communication with the world. In real life, we are often moved by the emotional resonance brought about by artistic works. These works have the power to touch our souls and evoke emotional responses. However, traditional art creation processes often rely on artists' understanding and expression of emotions. **F**o r AI, emotion is a relatively complex concept as it is generally considered an experience unique to h umans. AI systems operate based on algorithms and data, lacking the foundation of consciousness a nd emotions.

However, with the continuous development of artificial intelligence technology, emotion computing is gradually becoming a breakthrough point. It holds the potential to address the communication gap between AI and user emotions and inject emotional factors into generated works. Emotion computing in artificial intelligence is a technical application that involves human emotions and feelings. It aims to enable machines to recognize, understand, analyze, and simulate human emotions. It involves the understanding, judgment, and expression of human emotions and applying these processes to AI systems. The core of emotion computing lies in extracting emotion information through data analysis and processing. It can be achieved through various methods, including text analysis, audio analysis, image analysis, and more. In text analysis, machines can recognize keywords, vocabulary, and context to understand the expressed emotions in the text. In audio analysis, machines can determine the speaker's emotional state based on the tone and intonation of their voice. In image analysis, machines can infer human emotions by analyzing facial expressions and body language. Emotion computing encompasses several aspects, including emotion recognition, emotion generation, and emotion expression. Emotion recognition involves identifying human emotional states, such as joy, anger, sorrow, or anxiety, by analyzing data like speech, text, or images. Emotion generation, on the other hand, allows machines to simulate and produce emotions using algorithms and models, creating works of art with emotions like sadness or humor. Emotion expression refers to effectively conveying generated emotions to users using artificial intelligence technology, aiming to evoke emotional resonance. Through emotion computing, artificial intelligence can simulate and create works that fulfill human emotional needs, thereby enhancing the capability and quality of art creation.

In the context of artistic creation, emotion computing technology can play a crucial role in understanding users' emotional needs and preferences. By incorporating emotion recognition capabilities into AI systems, artists and creators can generate works that not only possess technical brilliance but also resonate deeply with the audience's emotions. This can lead to more immersive and engaging artistic experiences. One prominent application of emotion computing technology in artistic creation is in the field of music. Music has always been closely tied to human emotions, and AI algorithms can now be trained to recognize and mimic these emotional nuances. By analyzing large datasets of music pieces annotated with emotional labels, AI models can learn to compose music that conveys specific emotions. **F**or example, a model trained on a dataset of sad music can generate melancholic compositions, while a model trained on joyful mu sic can create uplifting and energetic pieces. This ability to evoke specific emotions through AI-generated music can have a profound impact on listeners, creating a more emotional and persona l connection. Apart from music, emotion computing technology can also be applied to other art f orms such as poetry and painting. In poetry, for instance, AI models can analyze existing poems and identify patterns and structures that elicit specific emotions. Armed with this knowledge, AI

systems can generate original poems that capture the emotional essence of a given theme or topic. One exciting aspect of using emotion computing technology in artistic creation is the potential for collaboration between AI systems and human artists. AI algorithms can serve as creative partners, providing suggestions and inspirations based on their understanding of emotional aesthetics. Artists can then build upon these suggestions and infuse their unique artistic vision into the final creation. This collaboration between human creativity and AI intelligence has the potential to push the boundaries of artistic expression, leading to novel and emotionally resonant artworks.

Currently, the application of emotion computing technology still faces challenges. Emotion is a subjective and complex concept, and different individuals may have varying interpretations and expressions of emotions. Therefore, accurately simulating and generating works that meet users' emotional needs remains a difficult task. The development of emotion computing technology itself is not yet mature enough and requires further improvement in terms of accuracy and precision. Meanwhile, there is still debate over whether artificial intelligence can truly experience emotions during the creative process.

Artificial intelligence emotion computing still holds tremendous potential. It can provide us with better personalized services, help us understand and manage our emotions, and create more friendly and intelligent human-machine interactions. In the future, with continuous technological advancements and an expanding range of application scenarios, artificial intelligence emotion computing will play a greater role in various fields, bringing us more convenience and well-being.

Through the application of emotion computing technology, artificial intelligence can better understand and cater to users' emotional needs in the field of artistic creation, delivering works that evoke deeper emotional resonance in the audience. In the future, as emotion computing technology continues to develop, the emotional synergy between artificial intelligence and users will be further strengthened, bringing more surprises and innovations to artistic creations. Therefore, in the context of human resource management in AI artistic creation, it is crucial not only to focus on the collaborative work between users and AI but also to emphasize the emotional collaboration between users and AI.

7.Conclusion

7.1 Synergy of Human Resources in AI Art Platforms

Human Resource collaboration refers to the joint efforts of HR managers from different departments or teams to achieve the organization's HR goals and requirements. The importance of HR collaboration lies in emphasizing cross-departmental cooperation and information sharing. By establishing effective communication channels and shared platforms, HR managers from various departments can better understand the overall HR needs of the organization and undertake appropriate HR planning and management accordingly. This helps to avoid resource wastage and redundancy while improving the efficiency and overall performance of HR utilization.

In the context of AI art creation, due to the simplified workflow, decentralization, and individualistic nature of creative behaviors of users, there is no traditional collaboration issue between departments or positions. The collaboration in the management of AI art platforms primarily manifests in two aspects:

Firstly, collaboration between users. As users are relatively independent individuals, their collectiv e strength can be utilized through collaboration. **F**or example, the "Infinite Evolution" feature intro duced by 6pen Art promotes collaborative creation among users, allowing everyone to participate

by contributing their own creativity, inspiration, and ideas, resulting in continuous iterations and upgrades of artworks. Additionally, a story-based metaverse section has been created where a user initiates a story, proposes ideas for its development, and other users join in to collectively advance the narrative, incorporating visual and textual elements to engage users. Another common practice is organizing themed exhibitions where users create artworks centered around a specific theme, ultimately generating influence. Collaboration in HR management mainly involves coordination and collaborative creation among users, with projects such as exhibitions serving as the core.

To expand the reach and impact, users can interact with each other through features like liking, commenting, and sharing, fostering topical discussions and transforming creative resources into dissemination resources, leveraging the communicative advantages of HR collaboration.

Secondly, collaboration between users and AI. In the early stages of weak AI, users and AI act as two main entities in the creative process of AI art platforms, interdependent and cooperative. The relationship between human input (such as prompts) and AI roles during the creative process is an example of human-machine co-creation. Both humans and machines participate in art creation activities, leveraging their respective strengths and abilities to collaborate and communicate, resulting in unique and valuable artworks.

On one hand, human input plays a crucial guiding role in the creative process. Human creators provide the intent and goals of the creation, define the themes and styles, and determine constraints for the creation. This provides AI roles with clear guidance and helps them better understand the creator's intent and expectations. AI needs to possess the ability to comprehend human language, semantics, context, and emotions. On the other hand, AI possesses powerful computational and data analysis capabilities, allowing creators to perform tasks such as information searching, data processing, and content creation. AI roles can utilize algorithms and models to generate various creative possibilities and present them to creators for selection and optimization. Many AI art platforms generate multiple artworks for users to choose from, and users can also use these generated artworks as a basis for further iterations or modifications. Through human-machine co-creation, human creators can express their creativity and imagination , while AI roles can provide strong computational and analytical capabilities, jointly driving the realization of creativity. The perfect coordination between humans and AI roles makes the creation process more efficient and the results more surprising. Therefore, for AI art platforms, it is important to continuously expand the user base and plan core projects that foster user cohesion and team efforts. Additionally, innovation in technology is essential to upgrade AI capabilities, fully harnessing the advantages of HR collaboration.

7.2Human-machine Collaboration

The issue of human-machine collaboration in AI art HRM is a pressing challenge that needs to be addressed in the future. To achieve the goal of collaborative creation between humans and machines, it is necessary to further clarify the relationship between users and AI, avoiding the black box operation in AI art creation. **F**uture research can explore ways to improve the interpreta bility of AI art systems, enabling users to understand the process of generating artworks and engage in deeper collaboration with AI. Based on the previous survey analysis, the success of collaboration between users and AI has certain randomness and contingency, which cannot

guarantee the outcome of the collaboration. Enhancing the interpretability of AI art creation is crucial. AI systems sometimes make creative choices that are difficult to explain. Current AI art systems often operate as black boxes, making it challenging to explain the principles and logic behind the generated artworks. This kind of black box creative process makes it difficult for viewers or reviewers to understand the context of the artworks and fully evaluate their artistic value.

Interpretability refers to the ability to understand and explain the decision-making process of an AI system. When it comes to AI art, interpretability becomes vital to enable users, both experts and non-experts, to grasp the artistic expressions and conceptual underpinnings of the generated artwork. Without interpretability, AI-generated art may appear as abstract and inexplicable creations, limiting its accessibility and diminishing its value.

One way to enhance the interpretability of AI art creation is through the use of explainable AI techniques. This involves developing AI models that not only generate artwork but also provide explanations or justifications for the choices they make during the creative process. By revealing the underlying rules, algorithms, or data patterns behind the artwork, users can gain insights into the AI's decision-making process and better understand how the artwork was generated. Explainable AI techniques are essential in the context of AI-generated art. Without explanations, AI-generated art can feel like a black box, leaving users with little understanding of how the artwork came to be. Through the use of these techniques, however, the artwork becomes more transparent, enabling users to have a deeper appreciation for the AI's creative abilities.

One approach to achieving interpretability in AI-generated art is to develop AI models that can generate explanatory text alongside the artwork. These models can describe the artistic choices made by the AI, such as the selection of certain colors, shapes, or compositions. **F**or example, if an AI is trained to create landscape paintings, it can provide explanations for why it chose to include certain elements in the painting, such as the choice of a specific type of tree or the positioning of a mountain range. By providing such explanations, the AI makes its decision-making process more tr ansparent and allows users to understand the reasoning behind its artistic choices.

Art is often seen as a deeply human expression of creativity and emotion.By involving human artists, AI-generated art can draw from the rich pool of human experiences, emotions, and cultural contexts, thereby making the generated artwork more relatable and interpretable. AI systems can combine technical capabilities with human creativity, resulting in artwork that has a clearer artistic intention and meaning. Human artists can provide guidance and input to the AI, influencing its choices and helping to shape the final artwork. By involving human artists in the creative process, AI-generated art can inherit some of these qualities, creating artwork that resonates more strongly with audiences. The collaboration between humans and AI can result in a fusion of technical precision and artistic sensibilities, leading to artwork that not only showcases the capabilities of AI but also captures the essence of human creativity.This collaboration allows the AI to draw from the rich pool of human experiences, emotions, and cultural contexts, making the generated artwork more relatable and interpretable.

In order to enhance interpretability, it is crucial to develop evaluation metrics specific to AI art. These metrics should consider not only the aesthetic quality of the artwork but also its conceptual depth and originality. By establishing criteria that assess the artistic value of AI-generated art, users and viewers can have a standardized framework for interpretation, facilitating discussions and comparisons between different AI-generated artworks.

One of the challenges faced by AI art is the lack of clear evaluation metrics. In order to enhance interpretability and provide a standardized framework for interpretation, it is crucial to develop evaluation metrics specific to AI art.When evaluating AI art, it is important to consider not only the aesthetic quality of the artwork but also its conceptual depth and originality. Traditional art evaluation metrics, such as composition, color palette, and technique, may not be sufficient to assess the artistic value of AI-generated artworks. AI systems possess the ability to create innovative and unique artworks, which requires a different set of criteria for evaluation. One possible metric for evaluating AI-generated art is the integration of algorithms and human interpretation. While the AI system generates the artwork, human involvement in the creative process can help add conceptual depth and originality to the piece. Evaluating the extent and effectiveness of human intervention can provide insights into the artistic value of the artwork. Conceptual depth is another crucial aspect to consider when evaluating AI art. AI systems are capable of analyzing vast amounts of data in order to generate artwork. By examining the complexity and depth of the concepts represented in the artwork, we can determine the intellectual richness of the piece. This can be achieved by evaluating the level of abstraction, symbolism, narrative coherence, and the artist's ability to convey meaning through the artwork. Another important metric in evaluating AI art is originality. AI systems can produce a large volume of artwork effortlessly, but assessing the uniqueness and novelty of each piece is necessary. Originality can be evaluated by considering factors such as the use of unconventional techniques, the exploration of new artistic styles, or the creation of art that challenges traditional norms and conventions. By establishing evaluation metrics specific to AI art, we can provide users and viewers with a standardized framework for interpretation. This enables meaningful discussions and comparisons between different AI-generated artworks. A standardized evaluation framework allows for a more objective assessment of AI art, fostering transparency and credibility within the art community. Additionally, clear evaluation metrics can encourage artists and AI developers to push the boundaries of creativity and innovation in the field of AI-generated art. These metrics can serve as guidelines and benchmarks for artists, helping them refine their techniques and improve the quality of their creations.

Ethical considerations are also essential when enhancing the interpretability of AI art creation. Transparency in disclosing that a piece of artwork is generated by AI, and clearly defining the extent to which AI was involved in the creative process, is important to prevent any deception or misrepresentation.

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