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Exploration of Artistic Design Creation Driven by AIGC, from Inspiration Generation to Work Innovation

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Abstract: This is a developing trend in AIGC, bringing rapid growth with changes the design artistic industry has never seen before. Integrating AIGC with art design today promotes unprecedented increases in design efficiency, creative potential, and room for creativity for designers at large. However, to this date, AIGC technology is still in that improvement phase of ensuring continuity in image styles, their colors, and accuracy where follow-up instructions are concerned or served. Of them, the former influences the recognition of the brand and user experience, while the latter will influence accuracy and clarity, directly affecting the quality and efficiency of generated designs. This paper analyzes in detail the use of AIGC in the field of artistic design and research on the coherence of generated images and instructions in order to provide useful references to promote sustained development in this field.

1. Introduction

In the rapid development of today's technology, AIGC technology is changing with each passing day, deeply changing the face of artistic design. It has greatly broadened the creative boundaries of artistic design and raised the efficiency of designs consequently, enabling designers to create a richer and more diverse range of design works in a shorter period of time. From capturing inspiration to the finalization of works, AIGC technology has gradually turned out to be an indispensable creative tool in the work of art and design professionals. However, with the wide application of AIGC technology in the field of artistic design, several issues have gradually emerged. The urgent questions are, among other things, how the generated images from AIGC will continue to keep very close and appropriate consistency in terms of style, color, and composition toward the requirements for brand recognition and user experience. Moreover, instructions or prompts play a very important role in AIGC, as the precision and clarity of the prompts determine the quality and efficiency of the design generated. It elaborates deeply on how the inspiration created in the process of creating artistic design, from inspiration to work innovation, is inspired by AIGC, and comprehensively analyzes the application of AIGC technology in artistic design, research on consistency in generated images, and optimization in the use of instructions[1]. Through the research in this paper, we can contribute to providing valuable references for art and design professionals and thus promote the sustained development of the AIGC artistic design field.

2. AIGC and Artistic Design

2.1 Overview of AIGC Technology

Let's briefly trace the etymology of AIGC for readability and understanding. Historically, it goes back to the Dartmouth Conference in the 1950s. It was during this conference that John McCarthy first proposed the term "Artificial Intelligence," a bold step which has been regarded as the birth of the AI field, laying a sound theoretical basis for further development in the technology of AIGC. These are the symbolic and logical deduction foundations that, by manipulating symbols and performing logical operations, imitate human thinking processes to solve various problems using machines. Meanwhile, advances in computational theory and algorithms, such as the Turing machine model and algorithm complexity theory, paved the way for the creation of efficient AI algorithms. Heuristic searches and solution strategies, including A* algorithms, enable the effective exploration by the AI system in complex problem spaces[2]. Machine learning and statistics extract patterns and correlations within data that enable the AI system to self-align and optimize performance. Further, knowledge representation and reasoning, based on a number of methods including semantic networks and rule systems, help the AI system manage knowledge effectively. In fact, the development and growth of AI in the early years and their emergence up to AIGC are the theoretical precursors for AIGC to actually realize automated generation and innovation with enhancement in technologies like machine learning, natural language processing, and computer vision.

AIGC possesses the characteristics of automation, innovation, cross-modality, diversity, and scalability. In the field of design, it is defined as an innovation that can automatically create multimedia material, such as images, audio, and text, using artificial intelligence technology. It is a simulation of human cognition processes, which can be expressed as creation beyond the limitations of logical thinking in linear style, for example, arts. AIGC makes it possible for designers to instruct AI in designing through text instructions. It shifts from traditional physical sketching to digital and textual interaction modes. As opposed to other disciplines, which may be focused on other aspects of the generated content, in design, much emphasis is put on the high integration of art and technology in the creation of aesthetically pleasing and innovative works.

2.2 Applications of AIGC in Artistic Design

AIGC, in the design world, is an approach of artificial intelligence based on technical frameworks such as GANs and Stable Diffusion for image creation. Its core advantage is that it creates high-quality and creative images, audio, videos, texts, and three-dimensional interactive content. It helps designers, illustrators, photographers, and other professionals create fantastic digital pictures while incubating high-level artworks full of cultural connotation and special design elements, opening up a new path for the creation of artwork and protection of traditional culture. As an integrating method of art and technology in new content creation, AIGC possesses the highest artistic output capability and extensive application stage. AIGC deeply mines and analyzes millions of data, creates infinite new and attractive contents, and injects fresh vitality into artistic creation, cultural heritage preservation, and the entertainment industry[3].

AIGC technology can precisely grasp the designer's intention and needs in graphic design, automatically outputting images of specific styles and themes. Zhao Yongtao used GPT-3 to generate descriptions, keyword extraction from the description, using Stable Diffusion technology to create corresponding images based on these keywords. He integrated this algorithm into common special effect presentation techniques in graphic design for testing the rationality and practicality of the algorithm. The generated results showed that, in terms of speed and quality, it could meet the

requirements for practical applications. Speaking of three-dimensional design, it also can show extraordinary capability brought by AIGC technologies. The structure can automatically generate deep learning algorithms with complex shape three-dimensional models and rich textures. They are suitable for the cutting-edge application scenarios of virtual and augmented reality and will subsequently be of great value for designers in further creative conceptualization. The AIGC technology creates and generates in a manner that can learn from the big data in artworks, correctly master the characteristics and internal laws of the style, and then create new artworks based on this premise. Such AI-generated artworks are of high artistic value and provide new creative inspiration and ways of thinking for artists, which promote diversified development in artistic creation.

3. Study on the Consistency of Generated Images

3.1 The Importance of Consistency

The harmony of style and content should be strived for in artistic design. Not only does it relate to the overall aesthetic of the work, but also it will accurately convey design information and shape brand image. While currently available AIGC technology can generate images really fast, when dealing with some complex and intricate themes, the understanding of descriptive vocabulary is often at a literal level, with generated images so far from the real intention. Moreover, AIGC can only be creative within limits set by the datasets it will be trained on, basically able to offer no more than rearranged information without ever showing real creativity. This gives rise to complex ethical and copyright issues, such as questions of ownership and originality. Simultaneously, there are considerable shortcomings of AIGC in capturing and adapting to complex human feelings and social cues, making it inadequate for application scenarios that demand high levels of personalization and emotional investments. In this creation that calls for deep creativity and requires great emotional resonance, AIGC has certain limits and cannot keep pace with human creators in associated imaginings and emotional expressiveness[4]. Taking brand advertising design for example, if there is too much difference among advertisements of different brands in every other respect-in color, font, and graphically-the brand recognizability and memory points will be drastically reduced, thus affecting the market power of the brand. Therefore, in the process of AIGC technology for artistic design, how to guarantee high consistency in style and contents of generated images becomes an important factor in enhancing the quality of design and strengthening brand image.

3.2 Factors Affecting Consistency

Key aspects include the selection and training of AIGC models, the diversity and quality of the datasets, and the clarity and accuracy of instructions in their role for providing consistency between the generated images of AIGC technology and what the designer wants. Rigorous analysis of these various factors will shed light on how they are related to the consistency of the image output generated and hence give a sound foundation for subsequent improvement measures.

Selection and training methods of AIGC models relate directly to the consistency in style of generated images. In such a situation where designers use AIGC for creating images, selection of models is important to be weighed against specific design requirements or the desired style of designers[5]. GAN models are very good at generating images, though it depends on the model architecture of GANs. Since the StyleGAN series, most generated images feature rich details and a great variety of styles that would be suitable for applications requiring realism at high levels of detail. BigGAN and its variants are much more adept at producing highly colored, texturally rich images that would make them more suitable for use in creative and design-related fields. For example, using GAN in the practical choosing of restoring old photos: since GAN technology can

enhance low-resolution images and make them more clear and vivid, we will use the Fastai framework to apply the NoGAN algorithm on efficiently colorizing and restoring old photos, enabling these photos carrying historical memories to come alive and increase their vividness and realism.

Training datasets and data preprocessing affect the model directly during training; however, selecting which model is to be further tuned later in the actual process involves careful optimization in tuning parameters. For example, for designers who desire their images of certain styles or theme in a generated image should contain an enough amount of pictures. Meanwhile, diversity is also an important factor in the dataset. Because too homogeneous a dataset might result in a generated image which is too limited in style and lacks diversity. In actual operation, the designers can adopt the approach of transfer learning: based on the pre-trained model, fine-tune it in specific application scenarios. This will not only fasten the speed of training but also retain some of the advantages of the pre-trained model to some extent while adapting the model to new design requirements.

More importantly, the parameter setting during the training process also has an important impact on the coherence of generated images. Designers should pay attention to adjusting parameters according to the circumstances, including learning rates, batch size, and number of iterations. A too high learning rate will lead to no convergence when training the model, while an excessively low learning rate will result in a too slow convergence process or getting stuck at a local optimum.

3.3 Methods to Improve Consistency

The AIGC technique should be systematically improved and optimized from multiple dimensions to guarantee a high degree of consistency in style and content for the generated images. It is necessary to optimize model parameter settings, optimize the architecture of algorithms, and introduce new technical features in the AIGC model in order to adjust for better consistency. According to the GANs model, a designer can try changing a different loss function in trying to balance the realism versus diversity of generated images. For example, Earth Mover's Distance loss in Wasserstein GAN helps generate good quality and stable images[6]. This approach can be instantiated for image restoration tasks by allowing PGGANs models to generate high-quality restored images by progressively increasing resolution. Because generated images in PGGANs are created in a progressive process where the number of layers in both the generator and discriminator is progressively increased, this approach achieves great consistency-from details up to the global structure.

It is very important to enhance coherence with proper data preprocessing and standardization. In designing, input data should be cleaned, filtered, and standardized to make sure that the quality and consistency of the data are met. This will also include operations like resizing images, color correction, and optimization of textures. This approach can be applied in AIGC technology for old photo colorization using the CycleGAN model for style transfer. The process undergoes grayscaling of the old photo, standardization of image size, and resolution. Then, the CycleGAN model changes the grayscale image to a colored one by preserving the style and texture of the images.

Moreover, with further coherence of generated images in mind, instructions should be refined and unified, such as explanations about the meaning, function, and scope of application, and example images and descriptions to explain the specific requirements that are being asked for in the instructions. Designers may allow the StyleGAN model to generate images in a style specified by detailed descriptions and specifications for its instructions, in case they use AIGC for artistic creation. Taking the specification of the style of images generated as "Impressionism" as an example, one may give some representative works as example images, such as those by Monet. Then, through the adjusted parameter setting in the StyleGAN model, an impressionist-style image

would be in line with what the designer means. Once the creation is completed, an instruction feedback mechanism can be established to get and process timely feedback from the designers regarding their suggestions over instructions and then optimize continuously and improve the instruction system, so as to lead AIGC models for the generation of images with the satisfaction of design needs.

4. Use and Optimization of Instructions

4.1 The Role of Instructions in AIGC

In the broad areas of AIGC, instructions are the corner for AI creation and act as a bridge that connects human creativity with the intelligence of AI[7]. Just like a good director who painstakingly designs every scene to capture the intention and vision of users by AI with accuracy, an instruction does just about the same thing. In AIGC systems, one of the main tasks for instructions is to tell AI how to create content; what designers expect ranges from text generation to image synthesis, music synthesis, and so on. According to this, users input specific topics, style, or emotional tone requests into the GPT-series models so that the model can generate articles or dialogues to meet the needs of users. Similarly, models of DALL-E or Stable Diffusion applied to image generation make it possible for users to enter complex descriptive instructions that would then instruct the model to generate images of a specific scene and style. In the concrete design of a promotional poster for a café, for example, this may be the designer's input: "Design a promotional poster for a café in 'retro' style, with shades of brown and green in color. The coffee machine in an old version at the center, books at the background, and fresh greenery on top, providing enough warmth to the design for coziness." The clarity in the description with regard to the theme of the poster, style, coloring, and layout of elements makes AI produce a poster exactly as inspired by the imagination of the designer but filled with creativity.

Instructions not only serve as accurate navigation but also inspire creativity in AI. By cleverly combining keywords, describing styles and details, designers are able to guide AI in exploring more novel and unique expressions while sticking to the basic framework. Users can add such words as "abstract" or "dreamlike" in their instructions to the model in generating images, thus allowing it to try bolder and avant-garde design styles, giving users more options and innovative spaces.

4.2 Composition and Optimization of Instructions

One typical, complete, and effective instruction may include components like keyword choice and combination, style description, level of detail, clarity, and flexibility; these together create the structure and style for the generation of AI.

In a nutshell, keywords are the main guidelines for the model to provide results directly related to specific themes and directions. Determination of keywords should be based not only on users' intentions and needs but also on the capability and character of the AI model. If the keywords are carefully selected and appropriately combined, designers can clearly express their intentions and have AI create content that could meet their expectations. The use of the keyword combination "retro-style coastal city nightscape" by designers in, say, the design of city posters through DALL-E or Stable Diffusion, allows the theme and style to be specified at once. Other than keywords, instructions should also describe the style and detail. The latter part of the description can be abstract, like "romantic atmosphere" or "mysterious colors," or specific, for example, "using gold and black as the main color scheme" or "the elements in the image should show delicate textures." Besides, clarity in the instructions is apparently crucial to clearly and precisely convey users' intentions for accurate comprehension and execution by AI. While designers reduce the possibility

of misunderstanding or deviation with clear instructions, it enhances the quality and effectiveness of AI-generated content. However, instructions that are too rigid impede the creation and imagination of AI. To set instructions, therefore, a certain degree of flexibility must be considered in advance so that AI can express its unique creativity and imagination freely based on users' basic intention conservation. For instance, the "Celestial Book" by Guo Yaoxian uses Morse code and weaving to reflect on the common origins of written word and fabric, allowing the audiences to create new "language elements" and "poetic chapters" in participation. "Birdsong" by Helena Nicholson trains neural networks on nightingale songs in order to build up a harmonious coexistence communication model between animals and machines that subtly demonstrates the beauty of imprecision in application. These artworks have indeed struck a balance with the algorithms and are infinitely creative, showcasing full experimentation in the fusion between technology and art, including the uncertainty that might be inside.

5. Conclusion

The AIGC technology continues to demonstrate immense potential on the vast stage of art design. It not only profoundly impacts every aspect of artistic creation, from initial conceptualization to the final shaping of products, but also significantly alters traditional artistic creation processes in multiple ways. In the field of art design, AIGC can accurately capture designers' intentions and rapidly generate high-quality and creative multimedia materials such as images, audio, and video, opening up a new path for artistic creation and cultural heritage preservation. When discussing the consistency of generated images, we recognize that maintaining consistency in style and content is crucial for enhancing the overall aesthetic appeal of design works, accurately conveying design information, and shaping brand images. The selection and training of AIGC models, the diversity and quality of datasets, and the clarity and accuracy of instructions are key factors influencing the consistency of generated images. In terms of instruction use and optimization, we emphasize the bridging role of instructions in AIGC. They serve not only as navigation tools for AI creation but also as key drivers to unlock AI's creative potential. The AIGC technology is leading a comprehensive transformation in the field of art design, from inspiration generation to work innovation. As the technology continues to mature and optimize in the future, we anticipate that AIGC will further unleash the infinite possibilities of art design, ushering in a new era of art design that is more diverse, efficient, and creative.

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