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Editorial for Special Issue on Artificial Intelligence for Art

As an innovative engine for digital content generation, AI-generated content (AIGC) has drawn more and more attention from academic fields as well as industries. Specifically in the area of art creation, AI has demonstrated its great potential and gained increasing popularity. People are greatly impressed by AI painting, composing, writing, virtual hosting, fashion, and design. Moreover, AI is also becoming capable of understanding art, evaluating the aesthetic value of art, and protecting the copyright of art as well. AI has not only exhibited creativity to some extent, but also served as an enabling tool to discover the principles underneath creativity and imagination, which are traditional challenges for neuroscience, cognitive science, and psychology. Despite all these promising features of AI for art, we still have to face the many challenges such as the explainability of generative models and the copyright issues of AI art works.

This special issue seeks original and novel contributions toward advancing the theory, architecture, algorithmic design, and applications for artificial intelligence in art creation, understanding, evaluation as well as protection. The special issue will provide a timely collection of recent advances to benefit the researchers and practitioners working in the cross research fields of machine intelligence, art, affective computing, computer vision, multimedia, design, cognitive science, and psychology. Finally, six papers are accepted to form this special issue.

The first paper, entitled "Cogeneration of Innovative Audio-visual Content: A New Challenge for Computing Art" from Mengting Liu et al., provides an in-depth review on cogeneration of innovative audio-visual content in the field of computing art. The authors introduce innovative achievements in audio-visual content generation from the perspective of visual and auditory art generation based on AI, including image and music datasets, visual and auditory content modelling, and related automatic generation systems. The objective and subjective evaluation metrics are also introduced. Besides, the authors propose a cogeneration mechanism of audio-visual content in multimodal tasks from image to music. Finally, new opportunities and challenges in the field of audio-visual synesthesia generation is comprehensively discussed.

The second paper, entitled "Exploring Variational Auto-encoder Architectures, Configurations, and Datasets for Generative Music Explainable AI" from Nick Bryan-Kinns et al., focuses on the topic of generative music explainable AI. The field of explainable AI (XAI) seeks to make complex and opaque AI models such as neural networks more understandable to people. One approach to XAI is to impose a small number of semantically meaningful attributes on generative AI models. The authors propose a systematic examination of the impact that different combinations of variational auto-encoder models, configurations of latent space, and training datasets have on music generation performance when 2 or 4 meaningful musical attributes are imposed on the generative model. Their findings are the first detailed comparisons of configurations of state-of-the-art generative AI models for music and can be used to help select and configure AI models, musical features, and datasets for more understandable generation of music.

The third paper, entitled "Deep Video Harmonization by Improving Spatial-temporal Consistency" from Xiuwen Chen et al., addresses the issue of video harmonization in video editing to achieve visual consistency by adjusting foreground appearances in both spatial and temporal dimensions. The authors propose a novel architecture for video harmonization by making full use of spatiotemporal features and yield temporally consistent harmonized results. They introduce multiscale harmonization by using nonlocal similarity on each scale to make the foreground more consistent with the background. They also propose a foreground temporal aggregator to dynamically aggregate neighboring frames at the feature level to ensure temporal consistency.

The fourth paper, entitled "Audio Mixing Inversion via Embodied Self-supervised Learning" from Haotian Zhou et al., approaches the issue of audio mixing inversion via embodied self-supervised learning. The method is capable of learning an inference neural network that takes a stereo mixdown and the raw audio sources as input and estimate mixing parameters used to create the mixdown by iteratively sampling and training. It is important that the method can explicitly model the mixing process in an interpretable way instead of using a black-box neural network model. A set of objective measures are used to evaluate the performance of the proposed method.

The fifth paper, entitled "AI for Supporting the Freedom of Drawing" from Xiaohua Sun and Juexiao Qin, explores AI's role in supporting the freedom of drawing. Although there have been various attempts at human-AI collaboration in drawing, it is difficult for researchers to consider the wide variety of specific problems and devel-

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op universal methods due to the openness, improvisation, and individuality of drawing. The authors first analyze the contents of drawing and the general creation process, then describe a mechanism for using AI to enable people to regain the freedom of drawing collaboratively. Finally, the authors propose a framework that describes methods for analyzing specific problems and quickly finding solutions by building connections between the influencing factors in drawing, the demands of humans, and possible implementation options.

The sixth paper, entitled "Weakly Supervised Object Localization with Background Suppression Erasing for Art Authentication and Copyright Protection" from Chaojie Wu et al., focuses on the problem of art forgery and infringement. Object detection and localization provide an efficient and effective means of art authentication and copyright protection. However, the acquisition of a precise detector requires large amounts of expensive pixel-level annotations. To alleviate this, the authors proposed a novel weakly supervised object localization (WSOL) with background superposition erasing (BSE), which recognizes objects with inexpensive image-level labels.

These papers discuss AI for art from diverse perspectives, including computing art, explainable music AI, video harmonization, audio mixing inversion, human-AI collaboration in drawing, and art authentication and copyright protection. These works provide valuable insights, methodologies, and techniques that contribute to the advancement of AI for art. We hope our readers will enjoy reading and learning from these cutting-edge works.

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