REPORT

PATHWAY TO FUTURE SYMBIOTIC CREATIVITY

BUILDING PLATFORM TECHNOLOGIES FOR SYMBOLIC CREATIVITY IN HONG KONG

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Executive Summary

Human creativity is best encapsulated through the creative arts. Artists create art work as an attempt to disseminate their self-expression and interpretation of their existence and environment. Ever since the time of the first cave drawings, the artist of any kind has persistently expanded their means of expression. Artificial Intelligence (AI) can be seen as the next step in this long endeavour.

In the context of art creation, artificial intelligence can be viewed as technology aiming to create a machine artist, which is able to produce its own representation of a concept. The artwork of an artificial intelligence will depend, as for a human artist, on its learning method and the artefacts encountered for training. And on the receiving end, the audience will play a central role in deciding whether the AI creation is art or just a machine created artifact with no artistic value. One central difference between machine and human is their experiences. Human lives and develops creativity in response to life experience and an array of different environments they may encounter. And the arts they create are often commentaries of their response to the worlds they inhabit. Whereas an AI creator is trained in an environment defined by human. Traditional machine learning, essentially speaking, is to automatically extract rules, so called as models trained by big data. Then the basic question is whether the output of the training model can be artistic? This question involves an extensive and disputable discussion across multidisciplinary domains.

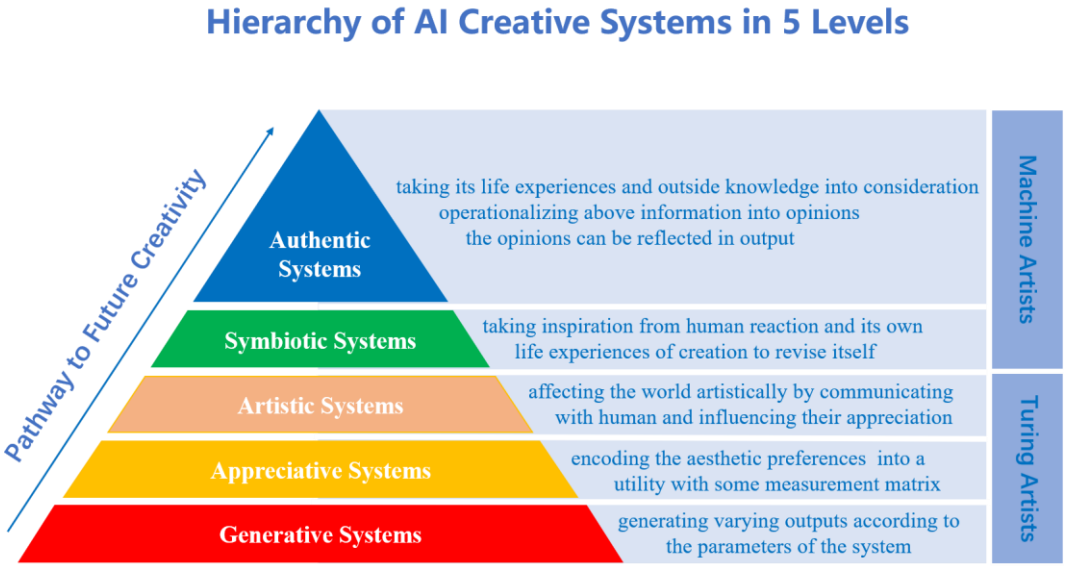

Fig. 1 Pathway to Future Creativity

A straightforward but oversimplified view to the AI-based art creation is to view AI as a tool. The recent development of AI, especially the generative learning technology, has demonstrated

the autonomous creativity of AI. A machine creator goes beyond as a tool but more like our companions. We do not envisage AI artist as a replacement of the human artist, but rather a supplement to the methodologies and tools available to the human artist. Thus, we believe in a new future of human-machine symbiotic art creation. This report presents a comprehensive view of our vision on the development path of the human-machine symbiotic art creation. Firstly, we propose a classification of creative system with a hierarchy of 5 classes, showing the pathway of creativity evolving from a mimic-human artist to becoming a machine artist in its own right (Fig. 1).

We begin by giving an overview of the developmental limitations connected to the Turing Artists systems. Then we focus on the top two-level systems, called Machine Artists, emphasizing on the communication between machine and human in art creation. For machines working alongside with humans in art creation, it is necessary to understand humans' mental states, including desires, appreciation and emotions. In addition, humans also need to understand machines' creative capabilities and limitations. The current rapid development of immersive visual environment and the further evolving into the new concept of metaverse enable the symbiotic art creation through an unprecedent flexibility of bi-directional communication between artists and art manifestation environments. By examining the development of current development of sensor and XR technologies, we illustrate the way novel art data can be collected to constitute the base to enable a new form of human-machine bidirectional communication and understanding in art creation. Based on such communication and understanding mechanisms, we propose for the first time a revolutionary framework for building future machine artists. The innovation comes with the philosophy that a human compatible AI system can not be designed based on the traditional “end-to-end” dogma, rather it should be based on the “human-in-the-loop” principle. By proposing a novel form of inverse reinforcement learning model, we outline the design of a platform for building machine artist systems. We will also demonstrate its functions and showcase some examples of technologies we have developed. We provide a systematic exposition of the whole ecosystem for AI-based symbiotic art form and community with an economic model built on NFT technology. Ethical issues connected to the development of machine artists will also be discussed in the report.