INK-SIGHT, MY SIGHT

(paper)

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Abstract

We explore art making through infusion an ancient medium (ink wash painting) with a contemporary medium (artificial neural network). The process started with traditional ink wash painting of house plants. The manual efforts of 500 paintings were base dataset to “nourish” AI models. Through successive interactions the artist’s “my sight” with trained “ink-sight” models. The artist and AI models evolved. The INK-SIGHT, MY SIGHT exhibition presented the original paintings, AI generated paintings, and behind the scene computer programming. The installation hoped to raise concerns and promote discussions on ethical issues of AI generated artworks. We also reflect on the experience of working with AI.

1. Introduction

INK-SIGHT, MY SIGHT is a creation of traditional ink wash painting combined with machine learning. It presents traditional oriental painting in a new way by adding the creative theme of growth with new technology. And explores the issue of artificial intelligence, as well as conveys the issues that the creators want to express through the exhibition.

Ink wash painting is representative of traditional Chinese painting. The term imitation is used in ink wash painting to refer to the imitation of artists’ brush techniques and styles, rather than to aspire to the realism of objects. Ink wash painting reflects the world as seen by the artist and is expressed through the work [1, 2]. Artificial intelligence learns from the input data, and through regular data arrangement and programming parameters, the model can have different training modes, and the regular training can make the image generated by the model have good quality. The creation process of this work focuses on the action of learning by artificial intelligence. Each time the model completes its training, it generates images of each stage. We observe these images and record the changes in the model, and observe how the model learns data through the images of different stages.

Almost the way we interact with the AI is the creator's perspective and the creator's point of view and the ideas of the AI model are only given by the creator. INK-SIGHT, MY SIGHT is composed of three series of creations, and developments series 2 and 3 based on the series 1. Through different data input and numerical settings, we trained six Ink-Sight models.

2. The Process

To use machine learning in the art creation process, we envision, during each training process, there may be some parts that we specifically want to let the AI model learn and hope that images generated by the model will have more of these features. Through the above studies, we identified the Generative Adversarial Network (GAN; [3]) as the basic machine learning framework. In particular, the pix2pixHD implementation [4] was adopted to train our own digital ink wash painting machine.

The process started with traditional ink wash painting (original painting) of house plants. To contrast the progress of art works, we also recorded the growth of a house plant in time-laps videos. We have developed Ink-Sight in three series: Natural Growth Series, Shadow Series, and Spaciousness Series. In Natural Growth Series (Ink-Sight_N models), we train Ink-Sight with the original painting. We noticed, while working with the Ink-Sight_N models, learned outcomes (e.g., Figure 1) with appearance of shadow or silhouette, or with spatial quality. This led to further dataset preparations and the training of Shadow Series (Ink-Sight_S models) and Spaciousness Series (Ink-Sight_P models) painting machines.

Figure 1. An Ink-Sight painting

Natural Growth Series (Ink-Sight_N models) is trained with 500 original paintings and their respective photos of house plants. The dataset contains 1000 image files (500 image pairs). Under the learning rate 0.0004, we set the training times of 100 and 200, and resulted two Ink-Sight_N models (Ink-Sight_N100, and Ink-Sight_N200).

Shadow Series (Ink-Sight_S models) is based on the Ink-Sight_N200 model with additional dataset to achieve the goal. We selected six sets of shadow-prominent image data from Ink-Sight_N100 and Ink-Sight_N200 models. From these data, a 100-image dataset and a 300-image dataset were created through random sampling. Under the learning rate 0.0004 and epoch 100, we trained the Ink-Sight_N200 model with additional dataset separately and resulted two Ink-Sight_S models (Ink-Sight_S100 and Ink-Sight_S300).

Spaciousness Series (Ink-Sight_P models) is based on the Ink-Sight_N200 model with additional dataset to achieve the goal. We selected ten sets of space-prominent image data from Ink-

Sight_N200 model. From these data, a 100-image dataset and a 300-image dataset were created through random sampling. Under the learning rate 0.0004 and epoch 100, we trained the Ink-Sight_N200 model with additional dataset separately and resulted two Ink-Sight_P models (Ink-Sight_P100 and Ink-Sight_P300).

3. The Installation

The INK-SIGHT, MY SIGHT installation (Figure 2) contains four parts. Part one, creation records, exhibit all 500 original paintings. Part two, ink wash painting files, exhibit paintings generated by Ink-Sight models. Part three, behind the image, displays program source code and execution logs. Part four exhibits model vision.

Figure 2. INK-SIGHT, MY SIGHT exhibition

Visitors can watch the exhibition to understand the whole learning process of artificial intelligence, the records, and the message behind the exhibition. The exhibition starts with a “document exhibition” to explore the production of artificial intelligence models. Visitors can sit on seats in the middle and feel the whole atmosphere of the exhibition. The chair is not only a place for visitors to sit and feel but also to rest and discuss. The movement of the exhibition is specially planned around the middle chair, which on the one hand symbolizes the relationship between the layers of artificial intelligence training and on the other hand indicates the sequential operation of the program.

The artificial intelligence model grows by learning input data through the algorithm of machine learning and then generates images after the training. We hope that the visitors can understand the training steps through the exhibition. It composes of two white walls and many boxes. The white walls mainly provides information and steps for the training of the artificial intelligence model, and the first wall describes the input label and input image of the model training (Figure 3, top).

Figure 3. Part I: creation records (top: derivation of Ink-Sight models; bottom: the original paintings)

The 500 pieces of original ink wash paintings are made on paper rolls linked

to the input image to simulate the data input and to visualize the model's learning of ink wash painting (Figure 3, bottom). The second wall represents the appearance of the six models after training (Figure 3, top). The square on the left indicates that the models will generate multiple models during training, and through the parameter setting of the computer, the models will be saved. The images will be generated by inputting the pictures into the computer, and finally, the concept of a tree diagram is used to represent the kinship between the six models. On the right side, the overlapping box is displaying the original ink wash painting and the video record of two plants on the table, which have been elements since I started to create. By recording the growth process of plants through cameras, we also metaphorically describe the process of co-evolution between plants and Ink-Sight models.

However, after watching the first part, these seemingly normal processes actually have a hidden problem--the content of the data directly affects the model's brain. That is, the model is only familiar with part of the data and cannot understand the whole, and the process of training artificial intelligence cannot be seen, nor can it fully understand its learning operation. In my series creation records, each series model will overwrite the previous content after a new training, and gradually turn to learn new data, and the characteristics of the generated image will be more similar to the new one. The second part, ink wash painting file, is a selection of the images generated by the six models. The records contain detailed training models and the process of generating images. 100 images are pasted on the wall in the form of photo frames so that viewers can see the details of the images and the information (Figure 4). The original paintings allows the viewer to see the results of learning ink wash painting by artificial intelligence, and also echoes the previous part.

Figure 4. Part II: ink wash painting files

Recording the image generation of each step of the model training looks like several paintings hung on the wall and several photo frames from afar. This arrangement actually has a special purpose: The artificial intelligence can also become an independent artist after training, so the production of the model can be regarded as a new creation. On the other hand, these images are all digital images, and this concept is the same as photography. The format of photography exhibitions is often presented in the form of exporting multiple photos and displaying them on the wall. This section of the exhibition is similar to a photographic exhibition, the viewer can feel like they are viewing a

painting as well as a digital image when watching the ink wash painting files.

The message of the second part is to reflect on the singularity of data in the training process of artificial intelligence with the image features produced by the model. And to link the third part: Under the Image. This work is composed of several long transparent celluloid strips with the training procedure printed on them. These transparent sheets of different heights and lengths flash and shake under the light. The invisible transparent sheets actually want to convey to the viewer that the training process should be open and transparent, including the input of data.

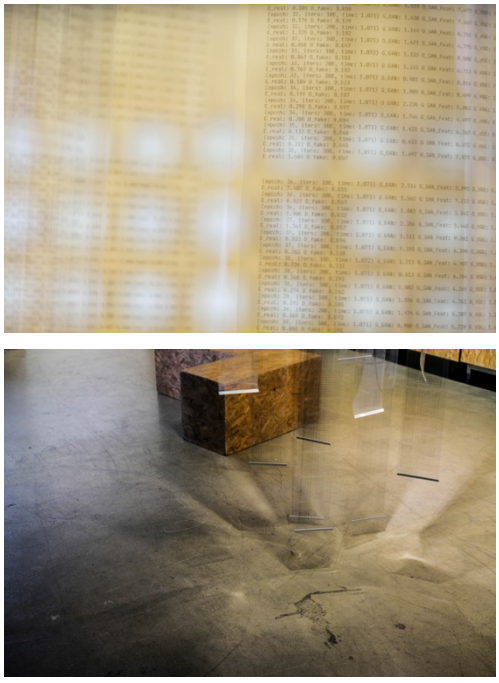

Figure 5. Part III: behind the image

Nowadays, there are many different artificial intelligence models with different parameters and computation methods. There is no related research or information on how to pursue the fairness of the training data process. In addition, another purpose of using transparent film in the third part of the work is to allow the viewer to see the fourth part and the second part.

The last part of the exhibition is also the fourth part: Model Vision. This is a composition of images generated from the same image input to different models. The models crop and merge the same image to show how different the same image is in the eyes of each model, and also to show the model's expertise. The fourth part, seen through the third part, means that these images were created through the training program, in the same way, that the second part is seen through the third part.

Figure 6. Part IV: model vision

4. Discussion and Reflection

Ink-Sight models are trained by human beings. Human beings inevitably have

personal preferences, therefore, models are bound to carry subjective thoughts of human trainers. Machine learning AI is bound to have more applications as the technology advances. The issues related to “fairness” and “ transparency” of the datasets and algorithms are being emphasized and debated. Machine learning AI is developing rapidly. There are many pre-trained models and online platforms for image creation (e.g., DALL-E, Midjourney, Playform), allowing people without computing program backgrounds to experiment. As a result, artificial intelligence art creations are increasing. The controversies of who should be the creator of the artworks are gradually gaining attention. INK-SIGHT, MY SIGHT aims to make visitors aware of the hidden dangers brought about by emerging technologies through its creation and exhibition, and to reflect on the application of artificial intelligence to modern society.

Ink-Sight models are infusions of an ancient medium (ink wash painting) with a contemporary medium (artificial neural network). With an input photo, these models can generate outputs with expressions of ink wash painting. From the utility perspective, Ink-Sight models are style tools with specific personal flavors. However, computational ink wash painting style simulation tools have been developed by many researchers (e.g., [5-11]). Our models as art creation tools may be very dear to us but may not be suitable for other artists. In fact, we consider Ink-Sight models are beyond tools; they are mediums of art making. An Ink-Sight model enables the artist trainer to examine her ink wash painting from a different light. The artist’s revelation, in turn, triggers new focus of expressions or affect dataset preparation of new Ink-Sight models. We have also observed such kind of intensive interactions between AI artists and computing technologies they use (see: [12]). Could Ink-Sight models be collaborators of the artist? It is not the case in our experience of INK-SIGHT, MY SIGHT. Nevertheless, with the inspiration of the artist Harold Cohen and AARON [13], we are keeping an open mind on the possibility of artists collaborating with their personal machine learning AIs.

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