The Trend and Characteristic of AI in Art Design

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Abstract. The future development trend of AI includes chat robot, knowledge extraction and calculation, AR enhancement, human-computer cooperation, automation and intelligent app platform. These trends will have a profound impact on art design, especially in the efficiency and aesthetic aspects of design, not only has the trend of replacing ordinary designers, but also is more likely to gradually have aesthetic awareness and thinking. These new changes will be combined with big data analysis and logical operation, sample learning and independent learning, and artificial intelligence will have greater development in the field of art design. The machine understands the data structure of the design. There are some related researches in the industry: parametric design and computational design.

1. Introduction
Intelligent design is the intersection of artificial intelligence and art design, covering a wide range of fields, such as data mining, knowledge atlas, architectural design, graphic design, fashion design, interactive design, industrial design, intelligent product design, etc. It includes: Artificial Intelligence Aided Design, artificial design intelligence system, user experience design of artificial intelligence products, artificial intelligence product manager and other fields. Especially the current media has developed into digital media, supplemented by broadcast and paper media, so the combination of artificial intelligence and design is bound to be closer.

2. About Intelligent Trend in Art Design
Artificial intelligence has developed into a basic technology, which can be used in various fields, such as robot, computer vision, natural language processing, even user experience, product design, architectural design, poster design and so on. From academic research to commercial implementation, AI is from substitution to enhancement. However, we must realize that artificial intelligence is not omnipotent. AI performs best when it is trained to perform or accelerate specific tasks. Past practices have shown that AI is not good at human level cognition or "generalized" intelligence; rather, it is good at tasks, such as understanding large data sets. The experience of commercialization tells us that users' expected change from substitution to enhancement of AI, we should define AI as something that can enhance human ability (rather than replace human). At the same time, more and more people begin to accept the idea of intelligent enhancement.

The so-called intelligent trend is more intelligent enhancement, including various applications of artificial intelligence and big data, such as personalized recommendation, software automation, etc., which is a relatively broad concept.
2.1. Trend One: Chat Robots
Use chat robot technology to reshape the user experience of the product. Representative product: Statmuse (Figure 1). Instant answers to your sports questions. Stats, scores, schedules just ask. The form of the product is not just a chat box (Interface), but a search we are familiar with. This product can ask any questions about sports.

![Figure 1. Interface after questioning on Statmuse.com](image)

We test a problem and return a data visualization chart. This query method is different from the traditional icon, which combines natural language understanding and data visualization. As shown below:

![Figure 2. Data visualization of interface after questioning on Statmuse.com](image)

2.2. Trend Two: Knowledge Extraction and Calculation
Knowledge is becoming an important resource that cannot be ignored in enterprises and other organizations. Representative product: Project cortex. Microsoft's project cortex will use AI knowledge map to greatly improve enterprise efficiency. In addition to the traditional "collaboration", "workflow" and "security management", the fourth pillar.

The knowledge map generated by AI can integrate the concept explanation, related information and relevant experts of a subject or content into a Wikipedia like knowledge subject card, and share with the members of the organization, greatly improving the efficiency of the whole company or the organization in sharing knowledge and experience among relevant employees. By taking users and information as nodes, connecting these nodes and judging potential connections, and then using AI to sort out all the relationships between nodes, a complete organization map is finally formed.
2.3. Trend Three: AR Enhanced Experience
Use AR Augmented Reality Technology to create a new user experience. AR based on AI technology can enable any product, but we need to pay attention to whether the user experience is improved after use. Representative product: Prezi AR.
Prezi is a web version of PPT tool; the biggest feature is its zoom (zoom). It breaks the logic of traditional PPT linear presentation, and can zoom and jump the page at will. In the past, for the live broadcast of a speech or conference, we can only use the method of split screen to project the speaker and the presentation at the same time, so your vision has to jump back and forth, affecting your attention. Through AR technology to better integrate the presentation content and the speaker's lens.

2.4. Trend Four: Human Computer Cooperation
Human computer cooperation, and the performance of cooperation with artificial intelligence determine your salary. The intellectualization of necessity is about various intelligent processes in our life. For example, experts in X-ray will be replaced by artificial intelligence. AI in law can read documents more efficiently than human paralegals. There are also pilots. For example, a plane's journey is 12 hours. A human pilot only needs to work for seven or eight minutes. The rest of the time is the case of AI driving the plane and so on. For product: LinkedIn's word assistant. LinkedIn developed an AI assistant plug-in for word to provide users with resume modification suggestions.

2.5. Trend Five: Automation
Simplify complex functions. AI can help us to skip some tedious workflow, such as cutting pictures of various sizes, adjusting colours and so on, which will take us a lot of time and try again and again. Representative product: Adobe spark.
Resize function can automatically adjust posters to various sizes. We can use it to quickly create posters for third-party social platforms, such as Instagram, Facebook, Twitter, Pinterest, etc.

2.6. Trend Six: Intelligent App Platform
It is an intelligent platform integrating API (or web app) services scattered all over the world, and the typical product form is browser. Representative product: station.
It is an intelligent browser. By modularizing various web page applications, users can automatically send notifications through various intelligent functions, such as completing a task, automatically importing Google form data into an email and sending it to specific users, etc.

3. Artificial Design Intelligence
Artificial design intelligence, or ADI for short, is an AI, not a human. It refers to the artificial intelligence that has design knowledge. It uses machine learning technology to predict design trends and generate design. If combined with personalized technology, it can generate thousands of designs.

Figure 3. One logo artificial design example on app.brandmark.io
In essence, artificial design intelligence is a model. The general process of building this model is to use algorithms to obtain rules from data, form the "knowledge" of the problem under study, and train
the model by building knowledge map and combining machine learning algorithm. This model is used to provide design decision and complete design tasks. In short, it is to teach machines to understand design and complete design tasks. In addition, all systems need to have a basic assumption, that is, the first principle.

The first principle originated from the ancient Greek philosopher Aristotle, who said: "there is the first principle in every system exploration. The first principle is a basic proposition and assumption, which cannot be omitted, deleted or violated." So, what is the first principle of artificial design intelligence? Brandmark uses similar font vectors to find the relationship between fonts. Brandmark wants to vectorise the icons in logo and fonts respectively to match. Brandmark thinks that bold font is related to the filled area of icon, so he sets a rule: the thicker the font, the larger the filled area of icon, which is a better design. This is one of the first principles of artificial design intelligence.

4. Teach Machines to Understand Design

We need to tell the machine some common sense. We have to configure the machine with an environment model similar to the real world. The same is true of Science: in order to explain the laws of the movement of celestial bodies, we first put forward the geocentric theory, and finally established the heliocentric theory.

The stage of machine understanding ability is summarized as: If then rule > relevance reasoning > causal reasoning.

There are three methods, one is to input rules similar to if then one by one; or use mutual information to mine questions and answers to form common sense (similar to relevance reasoning); or build a more complex knowledge map (similar to causal reasoning).

Judea pearl, the father of Bayesian networks, describes how real intelligent machines think about relevance and causal reasoning. He believes that the key is to replace the relevance reasoning by association with the causal reasoning. For example, he said, "machines need not only the ability to link fever to malaria, but also the ability to reason that malaria causes fever.”.

To teach machines to understand design, we need to prepare knowledge for machines, and the key knowledge is design language.

Turing said that instead of developing a program to simulate the thinking mode of adults, why not try to develop a program that can simulate the thinking mode of children? The next step is to educate the program properly, and it can become an adult's brain.

5. Change of Design Process

First of all, we understand the typical process of traditional design, and we complete a design task, which generally includes the following 4 design links: research and interview to obtain a large number of cases and experience; thinking collision, combining problems and solutions; prototype, or other results to show the design conclusions; collect the opinions of all parties, re optimize the design scheme; the final scheme is passed.

The process of AI aided design is: big data mining and processing, from text, image, social network, etc.; using machine learning algorithm, building knowledge map, repeatedly testing problems and solutions from the map; developing intelligent products or software systems; putting into use, collecting use data, iterating products or software systems; finally generating satisfactory solutions.

6. Conclusion

We need to design a language that both machines and designers can understand. Design language, is the communication standard between the designer and the machine. The machine understands the data structure of the design. At present, there are some related researches in the industry: parametric design and computational design. If there is time, readers can check the research on how to understand the design of machines in these fields. In the creation scenario, we need to use machines to enhance human capabilities, rather than machines to replace human beings. In the field of design, we call it artificial intelligence aided design, which advocates man-machine cooperation.
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