Application of Intelligent Art Design Technology Based on MBD

Weizong Cheng1,*, Yanlan Liu1
1Nanchang Institute of Science and Technology, Nanchang, 330108

*Corresponding author e-mail: 459453799@ncist.edu.cn

Abstract. Contemporary public art needs to be carefully designed with its unique advantages to achieve its wider diversity, participation and interaction. Based on the MBD process model, the basic process description and evaluation method of process design features are established. Based on the model definition, the key equipment information of process design is the initial data of process optimization. The process design and optimization are realized. It provides an application method based on full 3D model for art design and optimization. An application example of process design is established. Combined with the actual demonstration of MBD, the design optimization process model is an important guarantee for process design. The results show that the distribution of intelligent hardware users in South China accounts for 34.9%, and that in Central China accounts for at least 16.9%.

Keywords: Intelligent, Art Design, MBD Technology, Process MBD Model

1. Introduction
Design is the third intelligent system combining art and science. With the advent of information revolution, art design presents the development trend of interaction design, intelligent design, mobile game design, interface design and so on.

With the continuous development of computer technology, many experts have studied intelligent art design. These tasks are divided into a group of common tasks, such as task reorganization and task coordination mechanism. Organization design defines many coordination mechanisms. This paper discusses the interactive education mode of art design talents training based on Intelligent City, puts forward new implementation and improvement scheme, and analyzes the feasibility of the mode. By learning the user's behavior when interacting with the intelligent environment, the user's behavior can be predicted. Prepare the data set and train the predictor, which is responsible for determining whether the target sensor value should change. This solution has made significant improvements in all target sensor studies, and most parameter combinations produce better results than the base case. The model-based decision support system is constructed. In order to meet the needs of users, a series of innovations have been made in software development, such as object-oriented problem solving automation paradigm, object framework system formal and modular intelligent collaboration technology, hybrid reasoning system, connectionism framework utilization technology, and solutions have been proposed. Hybrid bond graph is used to model the hybrid system, which provides a basic
model for fault testing, fault tracking and detection, fault isolation and identification [1]. Some experts have studied the intelligent design of style concept. Firstly, it discusses the concept, characteristics and forms of intelligent art design. Secondly, it classifies intelligent art design from different perspectives. According to the characteristics of intelligent art design, this paper summarizes the general principles and methods of intelligent art design. Finally, according to different functions, the design of intelligent art design products is analyzed in detail. Through art design, we can collect data, use RF technology to transmit data to the display device and the designated computer, and connect the database with storage and display through visual design, which is convenient to grasp the changes of intelligent parameterization of art design, and form intelligent art design belt, which has fluidity and can carry out secondary development. The principle and method of intelligent system construction based on logic intelligent system are designed and developed, which can be used for complex tasks. These tasks are easy to be completed, but difficult to be completed by machine. Based on the analysis of the development of MBD, this paper analyzes the modeling method, implementation effect, challenge and implementation method of MBD. Finally, it puts forward the suggestion of MBD for high-level manufacturing enterprises in China [2]. Some experts have studied the digitization of MBD complex components, studied the design, security, availability, effectiveness, flexibility, robustness, scalability and adaptability of complex integrated system and network system of art design engineering, so as to realize complex big data transmission and network integration and security across multiple system regions. It creates an artistic example of such a concept and parallel universe, allowing art alumni to mix artistic expression. This paper introduces an artistic method of group dynamics psychoanalysis. MBD is a kind of design tool which uses simple industrial electronic devices to analyze the operation performed, and based on this information, the kinematics model of the process is established. The model is used to generate new control routines and reduce the complexity of the required tasks. The MBD system is also dedicated to designing "task optimization compliance" to further maximize the efficiency of specific tasks. By introducing this self-awareness, a simple robot can be upgraded to the most advanced learning machine. This paper introduces the design of an intelligent maintenance system to improve its usability. It combines the advantages of existing maintenance methods and different technical states. This is the first phase of the NMMs based solution, which will permanently monitor the system and propose the most appropriate maintenance measures. A greenhouse intelligent information management system based on client / server (C / s) and browser / server (B / s) is designed. Database subsystem and remote management subsystem detect greenhouse sensor network data in a distributed way. According to the humidity tolerance of Dendrobium, using JavaScript and XML (Ajax) technology, the fuzzy decision function reasoning of greenhouse temperature, humidity and light intensity based on Mamdani was realized [3]. Although the research results of intelligent art design are rich, there are still some deficiencies in the application of MBD based intelligent art design technology.

In order to study the application of intelligent art design technology based on MBD, this paper studies MBD and intelligent art design, and establishes the MBD design model of parts. The results show that MBD technology is conducive to intelligent art design.

2. Method

2.1. Mbd Technology

(1) The concept of MBD Technology

MBD technology based on model engineering definition is an advanced digital definition method, which marks all design definitions, process descriptions, attributes and management information related to products in 3D solid model [4]. MBD technology is a technology to identify manufacturing feature information with specific processing semantics through some algorithms in design model [5]. It can also be understood as the technology of transforming design features into manufacturing features with processing guiding significance [6]. The so-called feature recognition is based on the design model of product parts. From the design model, the design feature is transformed into a
topological structure with certain engineering semantics, namely machining feature. The recognition of machining feature is the basis of guiding process design and NC programming [7]. After feature intersection and combination, the boundary information of each feature no longer exists, but the trace of feature still exists in the design model of the part [8]. Therefore, machining features can be identified according to the residual trajectory information [9]. Feature tracking can obtain information from all aspects [10].

(2) MBD product design

The process model is used to express the evolution process of parts from blank, rough machining, semi finish machining to finish machining, and the relationship between the process models is established according to the single data source concept of MBD [11]. Therefore, the research of process model generation technology has become the main research content of process planning system based on MBD technology. Based on the digital product design system, combined with the product manufacturing process and other comprehensive factors, considering the process and economy of product processing, a three-dimensional model is designed to meet the functional requirements of the product. In the product design stage, it should meet the modeling specifications and standards of 3D model. At the same time, according to the model standards, the relevant standards of model inspection are formulated to implement the follow-up model review process. The definition and expression of MBD product model is simpler and clearer than traditional technology, and the data transmission is more secure and efficient. MBD product model data information is a comprehensive single data source. Employees only need one model data to obtain all relevant information of product parts, including product model design information, product manufacturing information, product inspection information, product attribute information and audit verification information.

(3) MBD dataset content

MBD design model is mainly composed of geometric elements and non geometric elements, geometric elements include geometric model and auxiliary geometry, non geometric elements include notes, attributes and notes; MBD process model is a series of process models formed on the basis of MBD design model. The following geometric modeling features are usually included: basic modeling features, additional modeling features, edit operation features, and other features. At present, domestic enterprises have not developed 3D CAD software which can be used as the support platform of MBD digital modeling.

2.2. Intelligent art design

(1) The concept of intelligent art design

The intellectualization of art design is to realize the entertainment of art design by endowing the traditional art design with functional features. Function and entertainment are two characteristics of intelligent art design. Entertainment is the commonness of art design products. Functionality is a significant feature of intelligent art design compared with traditional art design. It combines some widely used acousto-optic and information technologies. On the basis of the original play, more interactive technology, visual, tactile and auditory sensory experience are added to increase the comprehensive interest of the product. For different target consumers, the functional experience of product design is not the same. Different functionality and entertainment should be designed according to the physiological and psychological characteristics of users.

(2) Modular design of intelligent art design

Modular design is a unique design concept, which takes the combination and decomposition of modules as the main design method. The biggest characteristic of modular design is to get a new product system through the combination of each module unit. Some modules are independent products. How to combine these units into a complete product is a challenge for designers. Modular design is based on standardized design, and each combination unit in the whole system should have certain common attributes. In the whole system, the standardized design method is used to design and innovate the module. Modular design is a way of design thinking, and a comprehensive and standardized design process. Designers are required to consider the whole design in the early stage,
especially for the design of each independent module unit, the connection mode between modules should be considered.

2.3. Part MBD design model
The MBD design model of parts is composed of three-dimensional geometric model and basic design process information. Therefore, an expression can be defined as (1):

$$M_p = G_0 \bigcup_{i=1}^{n} A_i$$  

(1)

The operation MBD model consists of the geometric model of operation, the processing characteristics of the operation and the operation attributes of the corresponding operation. Therefore, the process MBD model can be expressed in the following formula (2):

$$M_{p}^{\text{op}} = G_{p}^{\text{op}} \bigcup_{j=1}^{m} F_j \bigcup_{k=1}^{l} A_{k}^{M}$$  

(2)

Define a scaling factor s and a point Q. In three-dimensional space, the formula for scaling can be obtained as shown in formula (3):

$$v = sv; p = Q + s(p - Q)$$  

(3)

3. Experience

3.1. Extraction of experimental objects
Features are related to design and manufacturing activities, including engineering significance, basic geometric entities and information collection. From the perspective of features, any product part can be regarded as a series of simple features. The MBD modeling process of parts is actually a process of feature superposition, intersection or cutting. MBD model is established by using manufacturing features, which enhances the feature information processing ability of 3D software. The MBD model of product output by 3D software can be directly used to plan 3D process information.

3.2. Experimental analysis
In the 3D modeling software system, the establishment of layer is mainly used to manage and control different graphics, especially for complex assembly, it is the most appropriate and convenient to use layer to manage part model. In drawing, the designer can set it on different layers according to different categories and uses of the graphics, so as to achieve the purpose of unified management of layers. The first step is to decompose the 3D solid model to obtain a series of convex elements; the second step is to combine the convex elements obtained in the previous step according to the corresponding algorithm to obtain the voxels corresponding to the machining features; finally, according to the recognized voxels, the machining feature types are matched to construct the volume representation of the machining features.

4. Discussion

4.1. Regional distribution of intelligent hardware users in China
Under the guidance of national policies, to narrow the distribution gap between urban and rural dual structure and regional structure, it is necessary to realize the reasonable allocation of products in product design. Through a series of reasonable product design that can narrow the differences between urban and rural areas, improve the overall quality of public infrastructure, public service products and necessities of life. The design level of public facilities and products in urban and rural areas is basically the same, which has universality and publicity. The people equally participate in the modernization drive and share the fruits of modernization. The regional distribution of intelligent hardware users in China is shown in Table 1.
Table 1. Regional distribution of intelligent hardware users in China

| region         | proportion |
|----------------|------------|
| East China     | 21.7%      |
| Central China  | 16.9%      |
| North China    | 26.5%      |
| South China    | 34.9%      |

It can be seen from the above that the proportion of intelligent hardware users in East China is 21.7%, that in Central China is 16.9%, that in North China is 26.5%, and that in South China is 34.9%. The results are shown in Figure 1.

Figure 1. Regional distribution of intelligent hardware users in China

It can be seen from the above that the distribution of intelligent hardware users in South China accounts for 34.9% at most, and the distribution of intelligent hardware users in Central China accounts for 16.9% at least.

4.2. Penetration rate of intelligent hardware products

In the field of consumption, the ethics of intelligent product design mainly studies the rationality and legitimacy of intelligent product design as social consumption and spiritual consumption. To ensure the rationality and legitimacy of intelligent product consumption, in fact, from the perspective of intelligent product design, through careful preliminary research, reasonable technology integration and appropriate design innovation research, we can find a reasonable iteration cycle to solve the contradiction between iterative innovation cycle and product service life, so as to achieve the balance between the pursuit of fashion and iterative innovation. As shown in Table 2.

Table 2. Penetration rate of intelligent hardware products in China

| type            | Product penetration | Product popularity |
|-----------------|---------------------|--------------------|
| Smart home      | 31.8%               | 36.4%              |
| Intelligent medical | 27.5%         | 31.5%              |
| Intelligent medical | 40.7%         | 32.1%              |

It can be seen from the above that the penetration rate of smart home products is 31.8%, and the product popularity is 36.4%; the penetration rate of smart medical products is 27.5%, and the product popularity is 31.5%; the penetration rate of intelligent transportation products is 40.7%, and the product popularity is 32.1%. The results are shown in Figure 2.
It can be seen from the above that in the field of consumption, the penetration rate of intelligent transportation products is the highest, accounting for 40.7%, and the popularity of intelligent home products is the highest, accounting for 36.4%.

5. Conclusion
In the process of product art image design, the fuzzy cognitive theory of output variables is applied to the artificial intelligence operation of product art image, and the virtual intelligence simulation is realized. Through the analysis of system testing and design cases, artificial intelligence algorithm can effectively realize the storage of cognitive thinking, and play a feedback role in the optimization design of product plastic art image, which provides a technical reference for the research of product plastic art design. Based on the concept of human organization and the design principle of distributed intelligent system, a multi-agent system design framework is proposed. The framework describes the concept of organization design domain, which can be used as the basis of distributed intelligent system design. The concepts of task, control, operation, management, coordination and organization are introduced into the framework of agent organization.

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