Design and Research of 3D Somatosensory Interactive Simulation System for Arts and Crafts

Weiwei Wang(✉)

Science and Technology College, Gannan Normal University, Ganzhou 341000, Jiangxi, China
zhc010314@163.com

Abstract. The purpose of the 3D motion interaction simulation system based on behavioral interaction is to enhance the 3D motion interaction ability of arts and crafts, analyze the imaging characteristics of the simulation system through binocular visual imaging technology, and process the internal modules of the system. Through the behavioral interaction method, the 3D motion interaction of arts and crafts is controlled and simulated, and the software and hardware of arts and crafts 3D motion interaction system are designed and developed, and the 3D virtual test platform is built on the basis of the integrated information processing module. The final experimental results also show that the three-dimensional somatosensory interaction system of arts and crafts based on behavioral interaction has higher stability and less delay, which has greater advantages compared with the three-dimensional somatosensory interaction system of arts and crafts under traditional methods. Further research should be conducted on this basis to deepen the application and design of three-dimensional somatosensory interaction system.

Keywords: Simulation System · AD/DA · 3-Dimensional Motion Sensing

1 Introduction

The construction of three-dimensional motion sensing interaction simulation system of arts and crafts is based on visual information interaction and visual communication. Through behavior interaction and visual communication, [1] the information of arts and crafts can be reasonably analyzed. Using information interaction and three-dimensional imaging technology, [2] the visual texture of arts and crafts can be guaranteed to a certain extent. The purpose of constructing the 3-dimensional motion sensing interaction simulation system of arts and crafts is this. Through the simulation system, [4] the visual information of arts and crafts is reconstructed, and the system software and hardware are developed to realize the modular design of the system. The final system test also shows the superiority of the three-dimensional somatosensory interaction simulation system for arts and crafts based on behavioral interaction [3].

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2 Overall Structure and Framework of the System

By reconstructing the 3 D model and fitting the artwork with multidimensional parameters, the overall structure model of the 3-dimensional somatosensory interaction system of arts and crafts can be obtained. As shown in the Fig. 1.

3 Three-Dimensional Motion Sensing Fusion and Behavioral Interaction of Arts and Crafts

Using the single frame vector fusion method, the three-dimensional motion sensing of arts and crafts can obtain the corresponding fusion distribution function:

$$H(x) = c_j(x) + l^2 + \frac{4\pi}{g_x}(|f_j(x)|) \tag{1}$$

where, l is the number of learning, is the feature reconstruction attribute set, is the pixel feature distribution set [5]. Through the fuzzy rough set theory and reorganizing the three-dimensional somatosensory interaction visual graph of arts and crafts, [6] the pheromone distribution matrix of the joint feature parameter matching model can be obtained:

$$W_u = \left[f_j(x) + a\right]\frac{m}{|x_i, u_i|} - g^k.z(H(x)) \tag{2}$$

Specifically, the reconstructed similarity coefficient of the image is a. In order to obtain the feature analysis model of 3-dimensional motion interaction visual parameters of arts and crafts, [7] it is necessary to use Retinex algorithm and fuzzy information detection method to conduct high-resolution visual information reconstruction for the feature distribution set of low-illumination images.

$$M_{i,j} = \begin{cases} \frac{W_u}{f_j(x)} \times X \\ \frac{1-H(x)}{1-g_x} \times T \end{cases} \tag{3}$$

where, X is the information sampling point, and T is the feature segmentation threshold. By constructing the 3 d motion interaction information fusion model of arts and crafts, [8] the 3 d motion interaction fusion based on arts and crafts interaction can be realized [9].

4 System Design

4.1 Hardware Design

In order to realize the automatic control of the 3-dimensional motion sensing interaction simulation system of arts and crafts, [10] it is first necessary to use ADSP-BF537 and DSP design information processing methods, as well as ADSP-BF537BBC-5A to conduct visual information sampling and process information fusion processing and original information acquisition for the 3-dimensional motion sensing interaction simulation

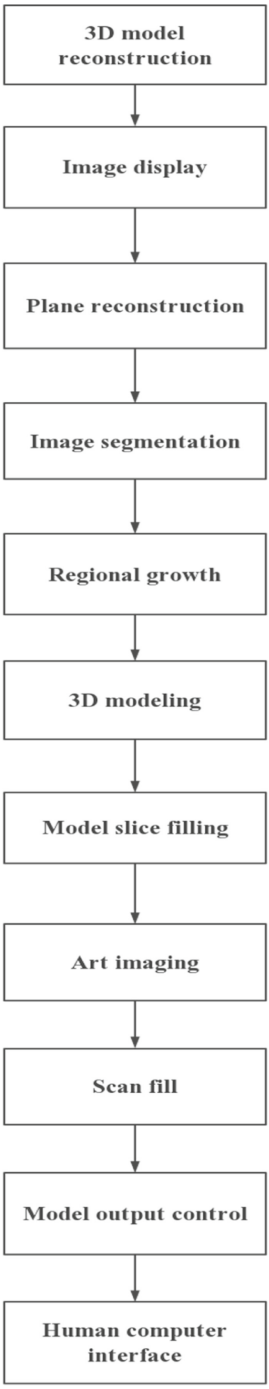

Fig. 1. Overall structure of the 3-dimensional motion-sensing interaction simulation system for Arts and Crafts.

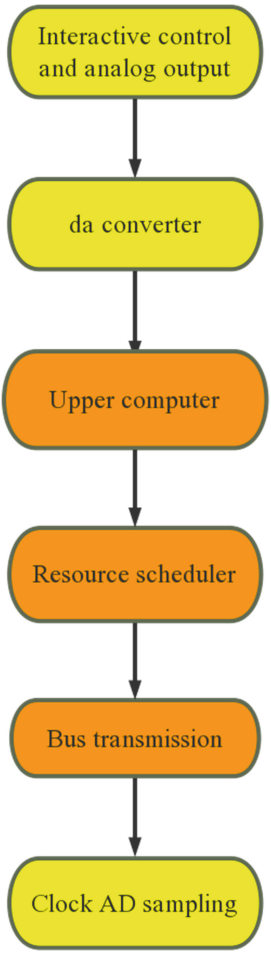

Fig. 2. Integrated information processing module of 3-dimensional motion-sensing interaction of arts and crafts.

system of arts and crafts[11]. Through the three-dimensional motion sensing interaction method of arts and crafts based on behavioral interaction, the three-dimensional motion sensing interaction system module of arts and crafts can be effectively controlled. In the Micro Channel expansion bus, the AD/DA converter can be used to transmit the 3-D motion sensing interaction information of arts and crafts, [14] and control the system only to form the corresponding information processing module [13].

4.2 Software Design

To conduct the software design of the three-dimensional motion sensing simulation system of arts and crafts products, it is necessary to develop the adaptive control module of the three-dimensional motion sensing simulation system of arts and crafts, [12] and

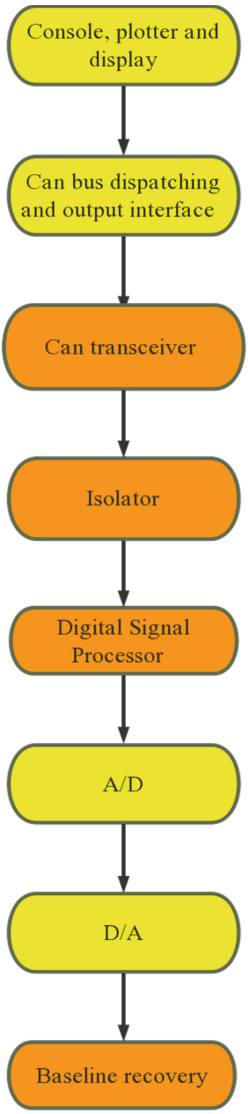

Fig. 3. System hardware integration implementation structure diagram.

form an integrated information processing device by using cross-compilation and clock control methods [16]. As can be seen from the Figs. 2 and 3, the output bus development and control of the 3-dimensional motion sensing interaction simulation system for arts and crafts is mainly realized through the bus development technology, [15] and its output information coding and software development depend on the AD/DA converter (Fig. 4).

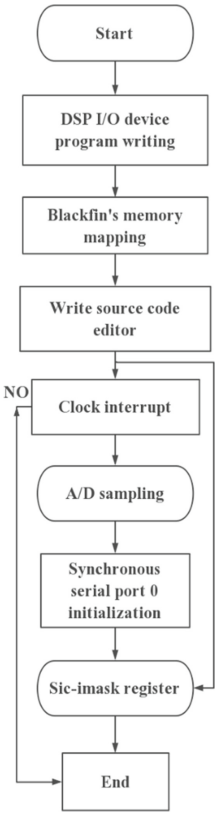

Fig. 4. Software implementation process of the system.

5 Simulation Test

According to the performance test of 3 D motion sensing interaction simulation system, the basic parameters are set: information perception intensity is 15. 8 kb/s, data information interaction bandwidth is 12. 8 db, and imaging edge contour coefficient is 0. 21. The resulting 3 D motion-sensing interaction simulation image of the craft artwork is shown in the following Fig. 5.

In order to continue to verify the stability of the three-dimensional motion sensing interaction simulation system based on arts and crafts based on behavioral interaction, it is compared with references 1 and references 2, and the comparison results are shown in Fig. 6.

Through the analysis of the Fig. 6, based on the behavior interaction of arts and crafts three-dimensional motion sensing interaction simulation continuous failure time can reach eighty days, but the other two methods of continuous fault free time can be more than sixty days, so also proves the arts based on behavior interaction three-dimensional motion sensing interaction simulation stability is better. In addition, the delay of the 3-dimensional motion sensing interaction simulation system for arts and crafts is tested.

Fig. 5. Three-dimensional analog images.

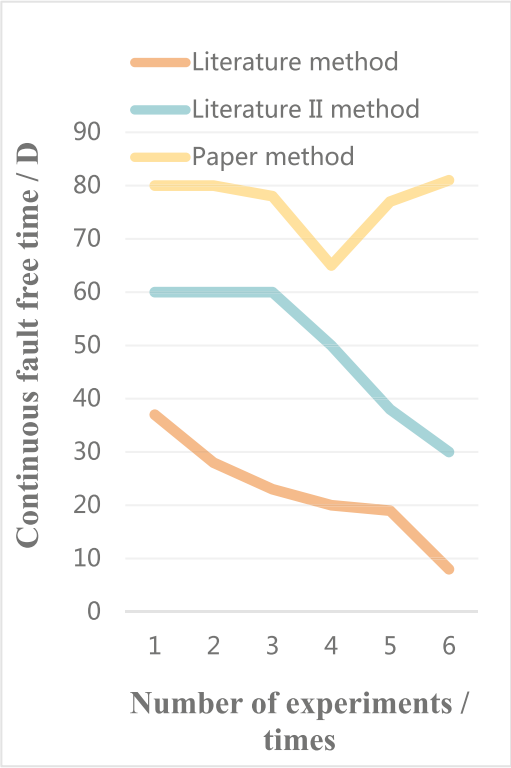

Fig. 6. Stability test.

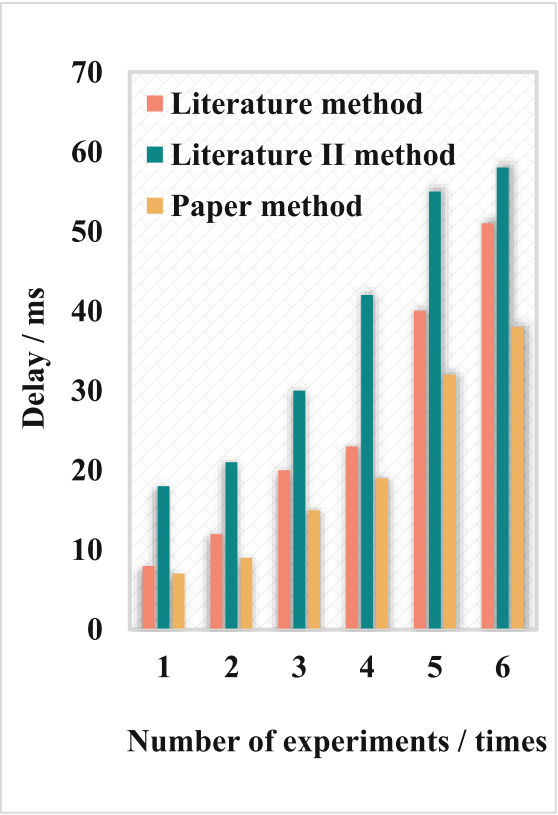

Fig. 7. Time delay test

Comparing the following three methods, the following figure can be obtained. It is also seen from the figure below that the more experiments, the greater the delay, while the smallest delay is the present method. The delay of the traditional method can only remain in the 8–58 ms interval (Fig. 7).

6 Conclusion

The design method of three-dimensional motion interaction simulation system based on behavior interaction can effectively improve the ability of three-dimensional motion interaction interaction and information communication and recognition of arts and crafts. By designing 3D motion sensing interaction simulation system of arts and crafts and using programmable logic control technology to conduct interactive simulation and information transmission of arts and crafts, the model construction of 3D motion sensing fusion and behavior interaction of arts and crafts can be realized. It can be learned from this design study that the three-dimensional motion sensing interaction simulation of arts and crafts has stronger stability and shorter delay.

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