Jaun L C. (2025) BODY TEACHING PRACTICE: DESIGN OF CHOREOGRAPHY AND CREATION SYSTEM FOR DANCE TRAINING. Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte vol. 25 (100) pp. 86-100.
DOI: https://doi.org/10.15366/rimcafd2025.100.006

ORIGINAL

BODY TEACHING PRACTICE: DESIGN OF CHOREOGRAPHY AND CREATION SYSTEM FOR DANCE TRAINING

Lu Chun Juan

Zhejiang A&F University, Hangzhou, 311300, China
E-mail: lucj1978777@163.com

Recibido 05 de junio de 2024 **Received** June 05, 2024
Aceptado 05 de diciembre de **2024 Accepted** December 05, 2024

ABSTRACT

Stage art is a multifaceted form of expression where space and time resonate with one another. During performances, dancers blend reality with choreographed scenarios, presenting a unique artistic experience to the audience. Music serves as the heartbeat of dance, while dance movements resonate with musical rhythms. These movements are organized and rhythmic, conveying emotions and creating artistic imagery. The diversity inherent in dance necessitates a wide array of styles and a rich combination of movements. Even seasoned motion capture companies face challenges in establishing extensive data sets that meet specific requirements. As the demand for choreography grows in today's society, traditional manual choreography can be time-consuming and labor-intensive. Thus, there is a pressing need to design and implement an intelligent choreography and display system. By integrating computational photography and intelligent system design grounded in data mining, costs can be reduced while enabling effective music choreography. This system has demonstrated the capability to generate superior dance sequences, achieving high user satisfaction and prompt responses, thus showcasing its practical application value.

KEYWORDS: Big Data Mining; Computational Photography; Choreography; Mobile Intelligent System

1. INTRODUCTION

After human beings have experienced primitive art, with the development and change of art culture, various arts have emerged one after

another (Allsopp & Lepecki, 2008). Among them, visual art and conceptual art, as the product of modernism and post-modernism, make dance video technology shine in visual art, and begin to be pursued and used by the world (Hirsch, 2011). Traditional choreography is time-consuming and laborious. It not only requires professional dancers to repeatedly and accurately dance to establish motion capture data, but also requires professional animators to correct the data, seriously hindering the further development of virtual character dance (Impett, 2019). In the process of choreography, the choreographers need to fully consider the stage space (Krishnan, 2013). Because the stage space will have an impact on the performance effect of the dance art, it is necessary to combine the stage space for editing and creation (Soga et al., 2017). There are many elements to be considered in the choreography process. Only from the perspective of comprehensive thinking can we help optimize the choreography process (Mustaniemi, 2020). For example, considering the elements of the stage space, combining the actual situation of the stage space to create a dance, and improving the quality of dance creation (Li et al., 2015). With the development of computer technology, more and more choreographers begin to realize the copying function of computer in the creation and display of dance art, and begin to explore the synthetic application of computer technology and dance image technology (Raskar et al., 2009). Therefore, the computer dance choreography system software came into being (Yuan, 2015). Applying computational photography technology to the innovative display of dance art is the biggest difference between new media dance area and traditional dance (Cruz-Filipe et al., 2022). In the specific dance display process, the digital display of actors' dance limbs is likely to be the key factor supporting the success of dance works. The intelligent system includes scene management, network management, interaction management, data management and other functions. Users are divided into administrators and ordinary users according to requirements (Dai et al., 2019). Dance creation should follow the objective law of the development of social life, and truly and typically reflect social life (Aristidou et al., 2022). However, the authenticity of dance creation is not only the original reproduction of the social life by the choreographers, but also the essential law of social life and the development of things with a correct and profound attitude. The biggest limitation of traditional dance is the fixation and unity of space and time. People often wear clothes and carry out body language display at specific places with music, while the audience receives sensory information directly at the scene, and there is no broadcast media. New media enrich the stage space of dance art, mainly thanks to the introduction of installation art. Through scene creation and reorganization in specific stage space, it presents different stage effects (Engel et al., 2011). What science and technology have in common with art is that they are rooted in creativity, which is why digital technology is used in dance art. Starting from the innovative idea of "choreographing for the camera", the image

pays attention to the artistic expression of subjective colors and the idea of being unconventional, which provides distinctive characteristics for the development of modern dance art (Mancioppi et al., 2009). The system constructed in this paper adopts a visualized dance teacher to interact with dancers, which can be realized by using GIF live animation or cartoon images with rich expressions and movements. In the process of applying this system, dancers will track and coach the whole dance movements, so that dancers can actually realize the effect of intelligent choreography (Wang & Yoon, 2021). The modern stage mainly has the types of extension and frame, and the modern stage has the types of track type and mobile rotary type. The plasticity of the stage space can be greatly enhanced by combining the soft and hard scenes of the stage with the large LED screen (Carey et al., 2019). In the new media era, "screen dance", with its short length, concise content, compact structure and other characteristics, makes the "camera language" from movies and traditional dance performances collide and cross on the Internet. While presenting gorgeous effects, it also causes us to think about the new creation method of dance art. The development of science and technology has also made the audience's aesthetic thinking and needs increasingly diversified. If the dance art wants to achieve sustainable development, it must be based on the times and dare to innovate (Rithe et al., 2013). Therefore, when creating dance, artists should be good at using new science and technology to make art collide with science and technology, break through the limitations of dance art, explore more development possibilities, and create dance works that are more in line with the needs of the times and the expectations of the audience (Lv et al., 2013).

2. Related Work

Wan G et al. established a matching model of actions and music clips based on the rhythm characteristics of music and dance actions, and used the dynamic time warping (DTW) algorithm to measure the rhythm matching degree of actions and music clips (Wan et al., 2012). Radu Timofte studied and analyzed in On the Thinking Tendency of the Construction of Dance Image Body Language that "the thinking tendency of dance image strengthens the overall morphology and imagery of body language in the development of modern dance art in a sense, breaks the space-time continuity and identity of traditional dance art action language, and strengthens the essential characteristics of dance art (Timofte et al., 2018). Li W, from the perspective of the interaction between dance and film, believes that dance images go beyond the definition of recording dance and become a creative and unique observation involved in a certain creative behavior and image perspective (Li et al., 2015). Through the analysis of different space shaping and different variations, we explore the application of new technology in the dance creation environment. Mcintoshsmith S N proposed that the introduction of virtual reality technology

makes dance choreography break through the restrictions of two-dimensional space and static stage, and also makes the ingenious ideas of choreographers appear in three-dimensional space and dynamic space (McIntosh-Smith et al., 2018). It is also possible to create some virtual characters and dance movements through computer technology, so that the space and time of the stage and the expressive force of the dance can be extended and the audience can feel immersive. Lv et al. proposed that the current situation and pattern of contemporary photography are complex and unpredictable, and many possibilities have created many mysteries for its future development and its impact on other art categories, as well as for the photography industry and ontology (Lv et al., 2013).

The interference of photography in reality has been strengthened, and the current development strategies and future development strategies and possibilities of the photography industry have put forward realistic requirements for rewriting the history of photography and repositioning photography (Yuan, 2015). The movement of Yuan W's dance is limited by the stage, and a limit is sent in the video and turned into a "picture frame". The "stage" in this image plays a limited role when the aircraft position changes and moves at different angles. The dance is constantly moving and changing. Even the static modeling is just a short moment. The change of lens angle directly affects the difference of the modeling effect of the dance screen (Engel et al., 2011). Krishnan D believes that photography is just a data collection process of computer digital computing (Krishnan, 2013). There is no real "original image" in "computational photography", but only data recorded by sensors. As a medium, photography has undergone tremendous changes, which are reflected in our visible and observable daily life.

3. Dance Image Technology Based on Computational Photography

3.1. Intelligent Choreography System

Stage picture scheduling is the main scheduling work of the choreographers. Dance picture scheduling requires the choreographers to pay attention to the use of focus, line, balance and other performance techniques. The scheduling of stage pictures and background music complement each other. Only the integration of stage scheduling and music can better set off the rhythmic beauty of the works. The computational photography technology provides more advanced and abundant technical support, which expands the function of dance choreography software. The choreographer can capture, observe and study dance movements through the computer, which undoubtedly greatly improves the efficiency of dance choreography. Analyze the song characteristics of the song by combining manual and automatic methods, and mark the time period, style, rhythm and beat of the song's paragraphs. There

are two steps to generate dance actions (Figure 1).

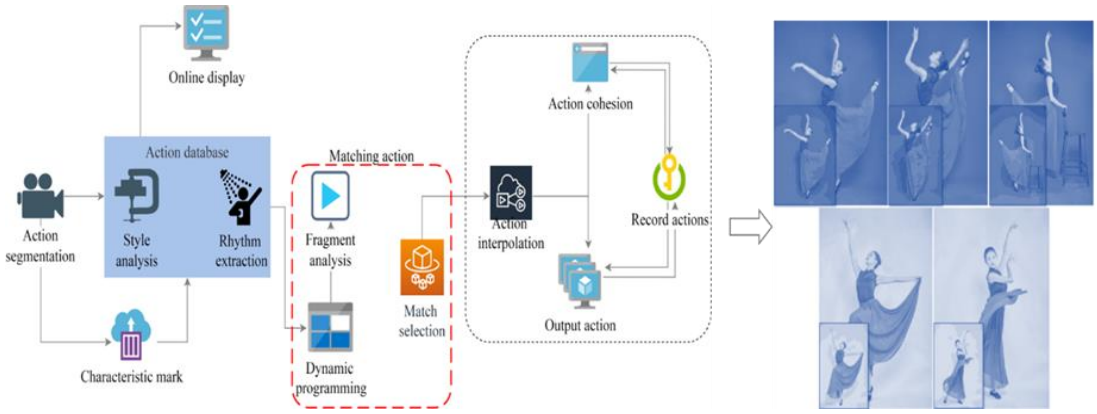

Figure 1: Overall Framework of Intelligent Choreography System

In essence, the creation of dance is a reflection of the editor on the level of logical thinking of real life. Starting from motivation, it is always closely connected and integrated with each other through the realistic representation of "editing" and "guiding".

3.2. Application of Computational Photography in Dance Creation

In recent years, the dance position has suddenly changed to the Internet, and the traditional stage performance and the "screen dance" represented by mobile internet devices have experienced a huge fission in presentation and creation methods. The recording function of the lens breaks through the limitation of the theater and the actual space. At the same time, it makes use of its own language features to show the details of the actors in the space more delicately on the premise of completely reproducing the theme and content (Rangel-Colmenero et al., 2022). It makes up for the lack of the image of dance works in time and space, and brings the audience the ultimate aesthetic visual enjoyment. It is a useful exploration to apply computational photography to the process of dance creation.

Computational photography is a new digital imaging technology derived from traditional digital photography (as shown in Figure 2). It can be processed by a series of software, including optical imaging, sensor capture, intelligent selection, and digital computing. The contents of computer vision, digital signal processing, graphics and iconography are deeply integrated, and the imaging principle of digital camera is completely changed from the shooting mode of traditional camera. Computational photography is a complex integrated system. This paper will organize the research content of computational photography according to the improvement of four elements (scene, optical system, sensor, image processor) in the traditional camera imaging process by computational photography.

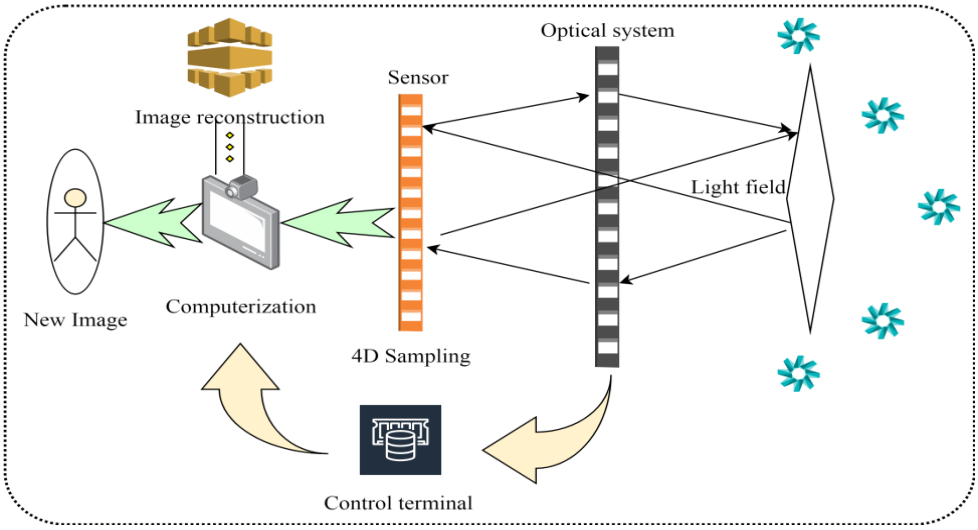

Figure 2: Compute the Imaging Process of the Camera

Camera language is in a subordinate position, dance body action is still the main expression of emotion, and the main role of camera language is reflected in the level of communication and recording. In order to adapt to the communication characteristics of the network era, multimedia has applied the network indiscriminately. Networked media has unprecedented inclusiveness, integrating all traditional information supported by text, pictures, sounds, videos and databases. Dance image is a kind of dance art form with unique artistic character and artistic existence mode. For the formation of correct dance image thinking, the creators need to stand on a certain level of professional knowledge and be able to flexibly use traditional body language. At the same time, combining with computational photography, the work should be reasonably processed in the later stage to lay a good foundation for the production of excellent dance works.

4. Using Data Mining to Construct Intelligent Choreography System

4.1. Data Mining Principle

Processing big data requires technologies different from traditional methods to effectively balance the relationship between our tolerance for time and system accuracy. Using big data technology, shared data can be extracted from the data information of each subsystem of dynamic dance choreography, and the cross regional and cross domain "data warehouse" can be integrated. While migrating historical data to the big data platform, ensure the integrity of the data and the comprehensibility of the relationship between the data. The data acquisition system mainly obtains information data through perceptron, RFID (Radio Frequency Identification), QR code, video surveillance and other methods to provide data sources for the next data processing and platform calculation (Figure 3).

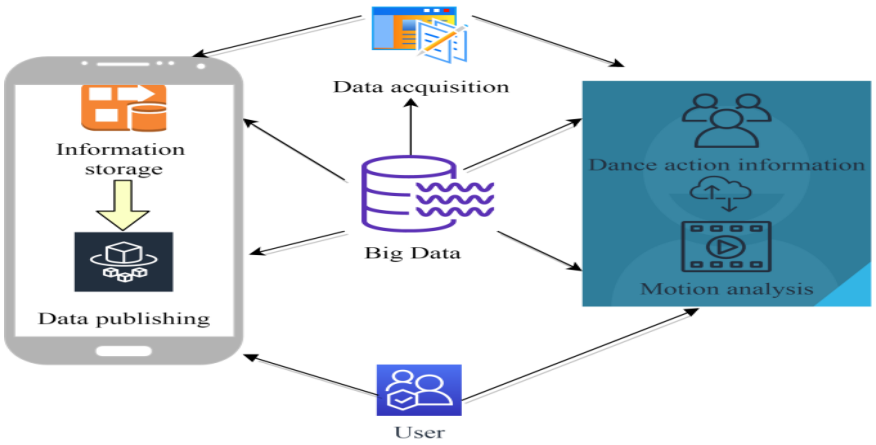

Figure 3: Data Mining Principle

In the process of data mining, first of all, through a clear understanding of the purpose of data mining, there is a clear definition of the object data to be operated. After determining the mining object of the data mining task, it is necessary to search all the data associated with this data mining task from the data set and select the data suitable for the data mining application. Finally, the time series data are merged and sorted, so as to improve the reliability and efficiency of data mining.

4.2. Algorithm Introduction

Through data mining technology, we can improve the utilization of various data and shorten the time for processing massive data. The collected action information intelligent monitoring big data is subject to information fusion and ambiguity detection. Multi sensor node information fusion method is adopted for big data fusion, and a sensor information tracking model is established. The probability distribution function of intelligent monitoring big data acquisition is obtained as follows:

$$w(x) = \sum_{j=1}^{h} w_i \delta_i(x) \tag{1}$$

In the collaborative cloud platform environment, the fuzzy parameter identification is conducted, the fuzzy degree parameter identification model is established, and the adaptive parameter distribution is calculated. The output big data statistical characteristic $J(w)$ can be expressed as:

$$J(w) = \sum r + t(e) + m \tag{2}$$

The linear combination model of big data mining of the intelligent scheduling system is as follows:

$$b_i = \frac{a_m + T_i}{q} + \sum_{i=1} p(w) \tag{3}$$

The Android terminal sends a POST request to the server PHP program. After receiving a response, it parses the returned JSON data, and then performs relevant UI processing. Data mining technology can help mobile intelligent system to extract the location of spatial objects, and improving the efficiency of spatial data mining algorithm can improve the performance of mobile intelligent system, and then quickly respond to user requests.

$$\Delta(\alpha) = \sum_i (y_i + f(x_i)) + \eta f(k) \tag{4}$$

Unsupervised learning method is used to determine the data center of hidden nodes in RBF neural network, and the expansion constant of hidden nodes is determined according to the distance between data centers. Then, the output weights of hidden nodes are trained through supervised learning, as shown in the following formula (5).

$$l = \sum_{e=1} r(e) + t(e) + x(t) \tag{5}$$

At different time n, the next time position of the action node can be calculated according to the current position, motion speed and direction of the action node. The specific calculation formula is shown in (6) and (7). □

$$x_n = x_{n-1} + v_{n+1} \cos d_n \tag{6}$$

$$y_n = y_{n-1} + v_{n+1} \sin d_n \tag{7}$$

Where, (x_n, y_n) and (x_{n-1}, y_{n-1}) are the coordinates of the node at time n and time $n-1$ respectively. v_{n+1} and d_n are the velocity and direction of the node at the moment respectively. When removing duplicates and errors, the integrity and validity of data should be checked first. The first thing to filter is the data missing the action information field. In addition, the data collected by the user's system that is not included in the information table should be filtered out.

$$□e(r) = \frac{w \cdot \sqrt{(\alpha_1 + \alpha_2)}}{2r} \tag{8}$$

Where, w represents the initial coding coefficient of frequent item index of association rules, r represents the frequent item coefficient index in the set environment, and $\alpha_1, , \alpha_2,$ represents the data parameter discrimination condition based on association rule mining algorithm. The terminal release is directly targeted at mobile system users. The data and analysis results generated previously can be directly released on various terminals to achieve information sharing and access for all end users, and provide different data according to the needs of different terminals. Under the action of association rule mining algorithm, the calculation result of association dispersion index

directly determines the real-time tracking ability of the system control host to the moving target. For example, when a user submits a task to the system, the task related information will be sent to the central node of the entire Map Reduce. Job Tracker is responsible for timing communication through other nodes in the cluster, and needs to manage which programs should be allocated to which devices.

$$R = \sqrt{\frac{a}{\beta(\mu_1+\mu_2+\cdots+\mu_n)}} \tag{9}$$

Make use of the data processing problem, install the necessary detection module in the data processing process, and clearly divide the data into online time, on-line time and off-line time. For the second-level data processing technology, it is necessary to integrate the stream processing method to analyze and calculate the data. The distance the user moves is defined as:

$$dis = min(d_\alpha, \overrightarrow{d_\beta}) \tag{10}$$

So far, the calculation and processing of various index parameters have been completed. Combined with all levels of hardware equipment structure, the smooth application of dance choreography mobile intelligent target tracking control system based on association rule mining is realized.

5. Validation Experiment and Results

In order to verify the effectiveness of the designed dance choreography moving intelligent target tracking control system based on data mining, a contrast experiment is designed. The object tracking control system based on association rule mining and the control system based on ROS (Robot operating system) algorithm are respectively applied in the control host, where the former is used as the experimental group and the latter as the control group. The optical motion capture system was used to collect two types of music and dance motion capture data, and a high-quality music and dance data set was constructed. The dance action database records and queries the action code of "beat style paragraph duration number" as the primary key. The corresponding action record file contains: duration, artistic score, Euclidean distance between the first frame and standard action, Euclidean distance between the last frame and standard action, and action data. The data and results analyzed under the big data platform can be published not only on the dance authoring terminal, but also on the dancer's app, realizing information sharing and access between the service terminal and the user's app. The test environment uses four mobile devices, one of which is Name Node and the other three are Data Node. The basic environment of the device has been set up, and the host names of each node and the corresponding IP addresses of the hosts are shown in Table 1. In order to make the program designed in this

paper easier to browse, correct, reuse and supplement, the independent modular development mode of hierarchical architecture is adopted. Finally, on the basis of meeting the requirements of basic functions, the user interaction experience is optimized.

Table 1: Host Name and IP Address Corresponding to Node

TYPE	HOST NAME	IP
NAME NODE	SOi Server	192.168.11.100
DATA NODE	node1	192.168.11.110
DATA NODE	node2	192.168.11.200
DATA NODE	node3	192.168.11.210

Under the lens language design, the picture of dance creation and design is no longer just based on the realistic material conditions. All the constituent elements form a symbol in the lens, and it is precisely the definition of this symbol that provides a very rich possibility for the picture. By analyzing the choreography, we can accurately decide when to cut into another angle or position. Not only cut off the redundant parts in the scene or dance, but also put the most important parts in the center of the camera, and at the same time, pull them in or out as needed. The dance sequences generated by the model and the comparison method in this paper are divided into 20 segments respectively. In addition, add real dance clips. A total of 60 clips were randomly selected and 30 clips were watched and scored by participants. However, it can be seen that the satisfaction of this method is high. Considering that they have higher requirements for dancing, it shows that although the current intelligent choreography method has already met the requirements of most dancers, the people who are more satisfied with this system feel that its convenience and operability are satisfactory (as shown in Table 2).

Table 2: Validation Experiment and Results

SATISFACTION (%)	TIMELINESS OF UPLOADING DATA (%)	OPERATION CONVENIENCE (%)	EXPECTED USE VALUE (%)
10%	8%	6%	5%
30%	10%	15%	19%
50%	32%	28%	41%
80%	79%	68%	80%
100%	93%	88%	94%

Under the same rhythm, style and paragraph characteristics, the dance movements with different durations of 20 seconds, 15 seconds, 10 seconds and 5 seconds were made through motion capture. To facilitate the judgment of splicing continuity during matching, Euclidean distances between the first and last frames of each action and the standard action are also recorded, and the data analysis results are shown in Figure 4 below.

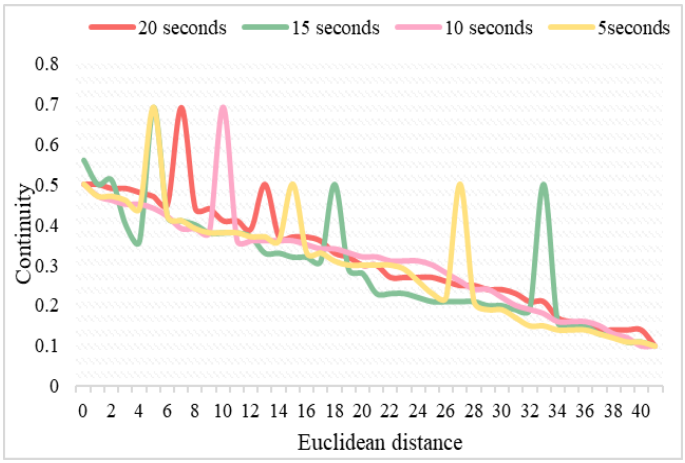

Figure 4: Comparison of Dance Coherence Corresponding to Different Music Segments

As can be seen from Figure 4, the dance action judgment based on the calculated image capture has a high degree of matching with the music fragment. Therefore, the mobile intelligent system needs to realize the following four functions: First, upload and download multimedia files such as audio files, dance files and video files. Secondly, manage the storage, classification and migration of multimedia files. Then, account approval, cancellation and other management. Finally, according to the audio file uploaded by the user, the choreography results are returned and displayed. Upload a multimedia file, which serves the intelligent choreography algorithm of the system, so users are required to provide accurately marked data, including audio start and end and dance start and end.

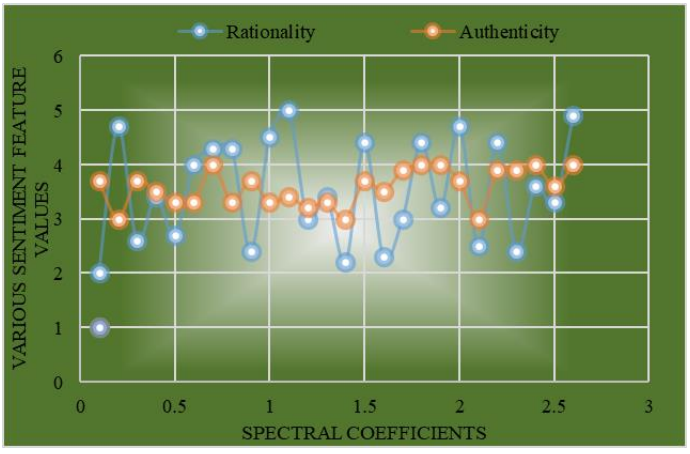

Figure 5: Distribution Characteristics of System Authenticity and Rationality

It can be seen from the above figure 5 that the score of the system evaluation in this paper, regardless of the rationality of the dance generated with music or the authenticity of the dance generated without music, is between 2 and 5, with a concentrated distribution of 3 and 4 points. This shows that most of the non-professional dancers have a positive evaluation of the results of this paper. Compared with the comparison model, the dance generated by this

method is authentic and reasonable. To modify the captured real motion data, two motion segments are spliced using three methods: motion mirror, affine transformation, and offset mapping. Motion image plays a key role in copying "source action" and "target action". Affine transformation helps animation designers eliminate the error caused by the size difference between the source object and target object. Offset mapping effectively corrects the motion calculation in one direction.

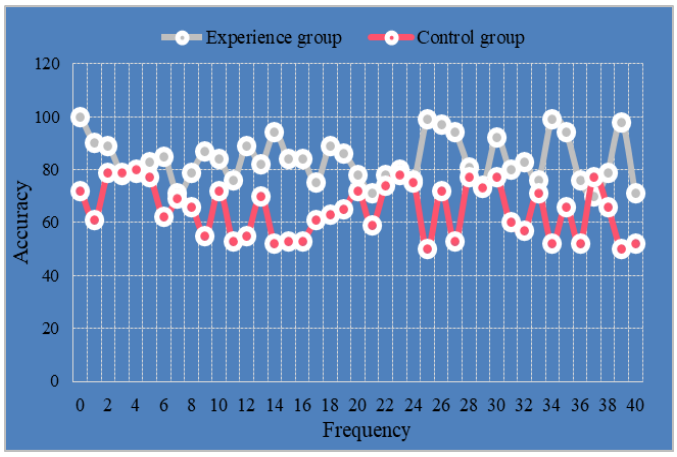

Figure 6: Tracking and Control Effect of Dynamic Target Object

During the moving process of the photographic equipment, select the corresponding dynamic person tracking target, and apply the control system of the experimental group and the control group respectively to analyze the collected target person images (as shown in Figure 6). Compared with the control system, the experimental system has a relatively strong ability to track and control dynamic objects. In the practical application process, the new control system can make the target object captured by the photographic equipment in the moving process fully conform to the ideal target setting conditions, which has strong practical value in the accurate tracking of the target node movement behavior.

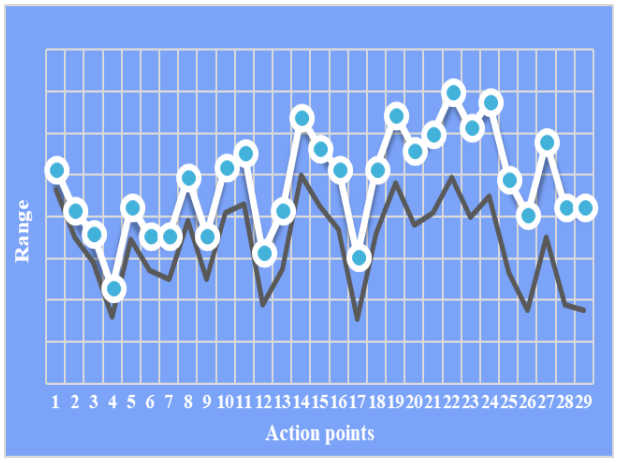

Figure 7: Data Mining Output of Mobile Intelligent System

It can be seen from Figure 7 that the output stability of the intelligent system using big data mining is good, and the fluctuation value of the intelligence and accuracy of the data mining output is consistent, indicating that they match. Firstly, motion capture technology is used to obtain human motion parameters in real life, and then offset mapping, motion affine transformation, motion mirror and other methods are used to arrange user selected motion segments into a new action sequence. Then, starting from the relationship between action sequences and audio segments, the author classifies actions and music segments in terms of their emotional attributes and emotional types of music, and establishes connections for them. The emotional ring is used as a link to drive the synchronous playing of audio and video. Experiments show that the algorithm works well.

Figure 8: Performance Comparison

To achieve an efficient and fast mobile intelligent system, it is necessary to collect complete system information. The big data platform is used to process and integrate the choreography information, to achieve real-time collection and summary of information from multiple angles, and to obtain action information in a timely manner. Through the analysis of action rules and music melody characteristics, it provides a variety of options for dancers, and can also use the best scheme analyzed by big data to guide users to quickly choreograph. Based on the above experimental results and the data analysis results in Figure 8, it is proved that the compilation accuracy of the designed system for big data mining is improved by 32.68%, and the identification ability of data parameters is good.

6. Conclusions

The combination of art and science and technology is the inevitable result of the development of the times, as is the dance art. The innovation of choreography is the product of the new media era, and its emergence and development are also the only way to dance art. It can be said that the use of

new media art means is gradually changing people's perception of dance art. Dance art has become increasingly accepted and sought after by the world because of the involvement of digital technology. Whether it is the creative record of dance art or the innovative display of dance art works, those ways that use computer technology to create dance performance space, enrich dance performance scenes, and enhance the appeal of dance performance art have made dance art find a better expression and extension in visual art. The research experiment in this paper shows that the dancers using this system can observe their actions in real time from all angles, and the modified actions designed can also be perfectly displayed in the animation. It realizes the transformation from the training analysis method based on experience to the human motion analysis method based on human motion simulation and simulation.

REFERENCES

Allsopp, R., & Lepecki, A. (2008). On choreography. In (Vol. 13, pp. 1-6): Taylor & Francis.

Aristidou, A., Yiannakidis, A., Aberman, K., Cohen-Or, D., Shamir, A., & Chrysanthou, Y. (2022). Rhythm is a dancer: Music-driven motion synthesis with global structure. *IEEE Transactions on Visualization and Computer Graphics*, *29*(8), 3519-3534.

Carey, K., Moran, A., & Rooney, B. (2019). Learning choreography: An investigation of motor imagery, attentional effort, and expertise in modern dance. *Frontiers in Psychology*, *10*, 422.

Cruz-Filipe, L., Larsen, K. S., Montesi, F., & Safina, L. (2022). Implementing choreography extraction. *arXiv preprint arXiv:2205.02636*.

Dai, Q., Wu, J., Fan, J., Xu, F., & Cao, X. (2019). Recent advances in computational photography. *Chinese Journal of Electronics*, *28*(1), 1-5.

Engel, R., Krathu, W., Zapletal, M., Pichler, C., van der Aalst, W. M., & Werthner, H. (2011). Process mining for electronic data interchange. E-Commerce and Web Technologies: 12th International Conference, EC-Web 2011, Toulouse, France, August 30-September 1, 2011. Proceedings 12,

Hirsch, M. (2011). *Blind deconvolution in scientific imaging & computational photography* Universität Tübingen].

Impett, L. (2019). Robot Aesthetics and Cultural Imperialism: the Double Hermeneutic of Computational Photography.

Krishnan, D. (2013). *Low-level image priors and laplacian preconditioners for applications in computer graphics and computational photography* New York University].

Li, W., Liu, Y., Yin, X., Wang, B., & Zhang, M. (2015). A computational photography algorithm for quality enhancement of single lens imaging deblurring. *Optik*, *126*(21), 2788-2792.

Lv, D., Wang, Y., Guo, C., Pan, Z., & Shi, H. (2013). Music-driven emotion model applied in digitalized dance performance of sacrificial ceremony for

confucius. *Transactions on Edutainment IX*, 205-212.

Mancioppi, M., Perepletchikov, M., Ryan, C., van den Heuvel, W.-J., & Papazoglou, M. P. (2009). Towards a quality model for choreography. European Conference on a Service-Based Internet,

McIntosh-Smith, S., Chohan, A., Curran, D., & Lokhmotov, A. (2018). High dynamic range computational photography on mobile gpus. In *GPU Pro 360 Guide to Mobile Devices* (pp. 245-280). AK Peters/CRC Press.

Mustaniemi, J. (2020). Computer vision methods for mobile imaging and 3D reconstruction.

Rangel-Colmenero, B., Hoyos-Flores, J., Hernandez-Cruz, G., Miranda-Mendoza, J., Gonzalez-Fimbres, R., Reynoso-Sanchez, L., & Naranjo-Orellana, J. (2022). BEHAVIOUR OF CHOLINESTERASES AFTER FATIGUE CONDITIONS IN ENDURANCE RUNNERS. *International Journal of Medicine & Science of Physical Activity & Sport/Revista Internacional de Medicina y Ciencias de la Actividad Física y del Deporte*, *22*(85).

Raskar, R., Tumblin, J., & Barsky, B. A. (2009). Computational Photography: Series: Synthesis Lectures on Computer Graphics and Animation.

Rithe, R., Raina, P., Ickes, N., Tenneti, S. V., & Chandrakasan, A. P. (2013). Reconfigurable processor for energy-efficient computational photography. *IEEE journal of solid-state circuits*, *48*(11), 2908-2919.

Soga, A., Yazaki, Y., Umino, B., & Hirayama, M. (2017). Automatic Synthesizing System of Choreography for Supporting Contemporary Dance Creation. Proceedings of the 20th Generative Art Conference,

Timofte, R., Van Gool, L., Yang, M.-H., Avidan, S., Matsushita, Y., & Yang, Q. (2018). Special Issue on Vision and Computational Photography and Graphics. *Computer Vision and Image Understanding*, *168*.

Wan, G., Horowitz, M., & Levoy, M. (2012). Applications of multi-bucket sensors to computational photography. *Stanford CG Lab Tech. Rep.*, 1-9.

Wang, L., & Yoon, K.-J. (2021). Deep learning for hdr imaging: State-of-the-art and future trends. *IEEE transactions on pattern analysis and machine intelligence*, *44*(12), 8874-8895.

Yuan, W. (2015). *Computational photography methods for visual mimo*. Rutgers The State University of New Jersey, School of Graduate Studies.