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Application Prospect of AR Augmented Reality Technology in Digital Media Art Design

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Abstract As of now, the use of PC innovation has understood the change of individuals' creation and way of life, and furthermore advanced the improvement of computerized media workmanship. The current media digitization and artistic strength is more and more powerful than the previous application. Involving its high level techniques and advancements for data show, this paper proposed to utilize AR innovation to coordinate and methodicallly develop galleries under the craft of computerized media workmanship, which is useful to dissect and tackle objective issues, for example, biological lopsidedness and single framework capability in advanced media workmanship. Based on the principles and laws of augmented reality technology, the construction and optimization of the museum guide system under digital media art is carried out. In the system evaluation experiment, the classical image is first used as the target image, and the image of 120 × 120 pixels at the center of the image is used as the image target. The target image is rotated in the range of 0 degrees to 180 degrees, and the feature points are coincident at different angles. In the experiments, RERIEF, ORB and BRIEF were compared. Among them, the ORB algorithm must calculate the orientation of the feature points before constructing the feature descriptor, so the ORB descriptor contains the directional features of the feature points and has rotation invariance. Its principal orientation is defined as the orientation of the feature points in the circular neighborhood, but the overall performance is still slightly worse than the RERIEF feature description. Therefore, the application prospect of AR technology in digital media design is very important.

Index Terms Digital Media Art, AR Augmented Reality Technology, Digital Museum, Image Preprocessing

I. Introduction

With the advancement of science and innovation, 5G has been quickly advocated, and AR innovation and gear have bit by bit gotten to the next level. The utilization of AR innovation assumes a significant part in the turn of events and scattering of advanced media workmanship. And the museum exhibition design under the digital media art in the digital media art is the top priority. Therefore, the museum work under China's digital media art should also keep pace with the times and carry out scientific digital management. Moreover, the museum collection data under digital media art is not easy to find and study, and the simulation of various situations and data of the museum under digital media art is not realistic enough. People's demand for museum information acquisition under digital media art is also increasing day by day, and traditional museum exhibition methods under digital media art are difficult to meet the needs of audiences. Therefore, it is very necessary to apply AR technology to the process of museum exhibition design and arrangement under digital media art. The impact of the current new crown epidemic in the context of globalization even exceeds the "Black Death". Against the background of the world being closed, the digital construction of museums under digital media art has developed rapidly. And during the "13th Five-Year Plan" period, China has established a large number of museums under digital digital media art. In the next five years, museums under digital media art will gradually build cultural heritage databases, and AR technology will be developed and applied to a great extent as a technological form developed in recent years.

After 2020, 5G networks will gradually become popular in China, and some virtual reality devices will gradually improve. Augmented reality technology, application equipment and living environment are becoming more and more perfect, people are full of expectations and curiosity about the manifestation and interactive experience of new technology. In order to survive and develop, museums in Europe under digital media art have begun to develop online virtual reality exhibitions with multiple people online at the same time, such as YORB Virtual Exhibition. When this technology is developed and popularized, all industries will be affected. Research in virtual reality will also bring opportunities for the development of augmented reality technology. The conditions for the realization of augmented reality are easier, the popularization cost is also lower than that of virtual reality, the combination of augmented reality and the commercial field is easier, and the augmented reality equipment will be improved faster. In turn, it brings convenience to the presentation of augmented reality in museums under digital media art The era of AR technology is coming. Before that, the problems existing in the process of museum exhibition design and exhibition arrangement under digital media art can be properly solved under the new technology, and the process of exhibition design and exhibition arrangement will also be optimized. The process of museum exhibition design and arrangement under the current digital media art is complicated and not intuitive enough. With the development of AR technology, the process of exhibition design and exhibition arrangement of museums under digital media art will be greatly developed, and the exhibition forms will also be enriched and developed. Driven by this era, what problems and breakthroughs can AR technology solve for the museum's exhibition design and installation process under digital media art? In this regard, this paper discusses the application research of AR technology in the process of exhibition design and installation.

The rise of digital media art is a very important topic in the field of art today. Among them, Li H proposed that in the construction of digital media practice teaching system, it should focus on professional curriculum reform and construction, formulate curriculum construction planning ideas, revise teaching plans, update practical teaching content, and form a complete teaching plan [1]. Kong W proposed that the emergence of digital media also shows that when people are under the influence of technology, the relationship between machines needs to be rethought [2]. Lucas T studied how fictional virtual reality technology manifests itself in the design of digital humanoid characters [3]. Yin L pointed out that the influence of ink painting style on digital media art is far-reaching. In 3D lens composition, it is necessary to arrange the light and dark density of the lens according to the artistic conception of the composition, and pay attention to the perspective characteristics of the ink knight. It is not a simple life scene that can have a suitable ink painting [4]. Seyfi M's research looks at digital media arts marketing campaigns through the lens of Covid19 fear, unlike other research. In this regard, the study is expected to contribute to the field [5]. However, the above research is only in the preliminary theoretical stage due to data and equipment reasons, and has little practicality.

Using AR technology to analyze the application prospects of digital media art is a very novel idea, and many scholars have studied it. Among them, Doan S proposed the increasing importance of new internet and social media technologies as sources of health information, leading to the shift of the pharmaceutical industry to digital channels [6]. Wlfel M has argued that for true progress and innovation, one must rethink text and accept text representation in digital media as an independent and mutable medium [7]. Dong O K's research was based on the visual characteristics of generative art. First, abstract randomness is expressed in the form of unexpected coincidences according to rules or algorithms, using the creator’s movement and material properties as variables [8]. Chen H is studying the application of digital media technology based on Maya MEL language in animation control. Starting from the form of digital media art works, combined with the production practice of Maya, MEL language animation was selected for the technology of controlling characters, and the solutions to the problems encountered in manual animation control were studied [9]. Karada G H proposed that AR live broadcast technology has always been a key element for broadcast media to attract large audiences. This attraction, known as immersion or immediacy, has been leading the broadcasting industry to embrace the latest technology [10]. However, the above research does not get rid of the definition and thinking based on traditional digital media art and AR technology, and cannot combine the two well.

The innovation of this paper is: This paper extracts relevant information from museology under digital media art, museum exhibition design and arrangement under digital media art, basic theory and application of AR technology, and analyzes the application of AR system in exhibition design and arrangement process. It optimizes the process of museum exhibition design and arrangement under digital media art, and builds AR collection database and AR design and construction application database together with database technology. The research field and the exhibition field are clearly divided, and the difficulty of exhibition design is reduced. Expanding the application research of AR technology in museum exhibition design and installation process under digital media art enriches visitors' visual and information communication channels while minimizing damage to cultural relics, which further promotes the optimization and development of the museum exhibition design and exhibition process under digital media art. The main innovations are as follows: (1) The use of AR design and construction tools can help China establish standardized design and construction procedures; AR technology can optimize the workflow of museum design and construction under digital media art; and help to establish collection index and build collection data system. AR technology can help simplify process design and solve construction problems. (2) AR technology can help design through simulation; AR technology can help troubleshoot construction problems. (3) AR technology can help the exhibition to be better presented. AR technology can bring information enhancement and enrich the exhibition form; AR technology participating in the exhibition of collections can help accurately convey information to different groups; using the AR exhibition form, using virtual space carriers to replace some electrical carriers, reduce safety hazards.

II. Digital Media Art Design Based on AR Technology

II. A.AR Technology System Framework

The right now applied expanded reality situation typically comprises of 6 practical modules, in particular picture procurement module, distinguishing proof and following module, 3D enrollment module, virtual-genuine combination module, terminal showcase module and human-PC connection module, as displayed in Figure 1.

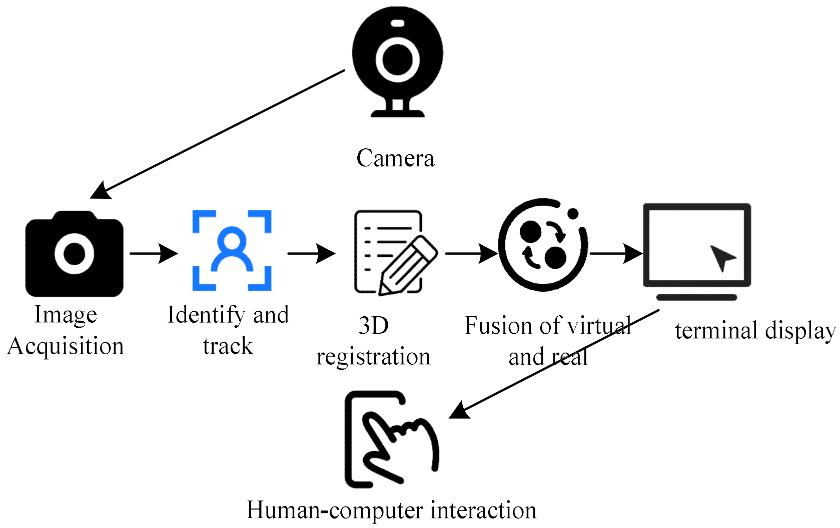


Figure 1: The main framework of the AR system

As can be seen from Figure 1, the image acquisition module is used to provide images for the augmented reality system, mainly the actual scene captured by the camera. Since the images captured by the cameras are in different color space formats, a unified format is required to facilitate further processing after the images are captured. Then, fake markers or regular highlights in the picture are handled by the acknowledgment and following module, and the 3D enlistment module is utilized to ascertain the place of the genuine article and the position and direction of the genuine item on the planet coordinate framework [11].

II. B.Identification Features and Coding Recognition

The feature acquisition of the identification point is actually to distinguish it from other points on the image, and the feature points generally have certain information to be displayed through this part of the pixel points. The local detection process of the image is used to obtain the feature points, which can reduce the amount of calculation and maintain the robustness of the system. Generally, these feature points have different gray values to distinguish them from other points in the environment, and can also extract feature points and non-feature points according to the characteristic that the curvature of the edge contour in the image changes greatly. The information represented by these specific points themselves needs to be distinguished from other points, and can represent the overall features of their local regions [12].

Obtaining these specific points by operating the image can reduce the total amount of data that needs to be calculated to a certain extent, and can also improve the accuracy of the system. Because the amount of information of the feature point itself is relatively large, it is replaced by the feature of the local area for this feature. At present, the calculation of feature points is used as a solution in most graphics processing technologies, such as image retrieval, splicing and matching. A valid feature point should have the following properties:

The first feature is repeatability. The so-called repeatability means that the information of the calculated feature points should be consistent when the same image is observed from different perspectives, that is, the same feature point can be repeatedly detected. The second characteristic is recognizability. It means that the information contained in the detected feature points can be clearly distinguished from other non-feature points, and can be recognized without complex calculations. The third property is locality. Locality means that it has a certain degree of stability. If the specified target is subjected to physical deformation, different lighting, and occlusion, it can effectively reduce its accuracy. The fourth property is quantitative. In the specified image, the number of feature points calculated at any time can meet the needs of the subsequent calculation of the entire system. For example, in the process of scale change of the target object, the number of obtained feature points can meet the needs of discrimination and recognition.

Since ARToolKit square marker points not only have the attributes of feature points, but also have the advantages of being easy to use, high recognition efficiency, and fast execution speed, they are used as artificial markers for mobile augmented reality research in this paper. Feature extraction and code recognition as ARToolKit identification points are usually carried out using the following steps, as shown in Figure 2.

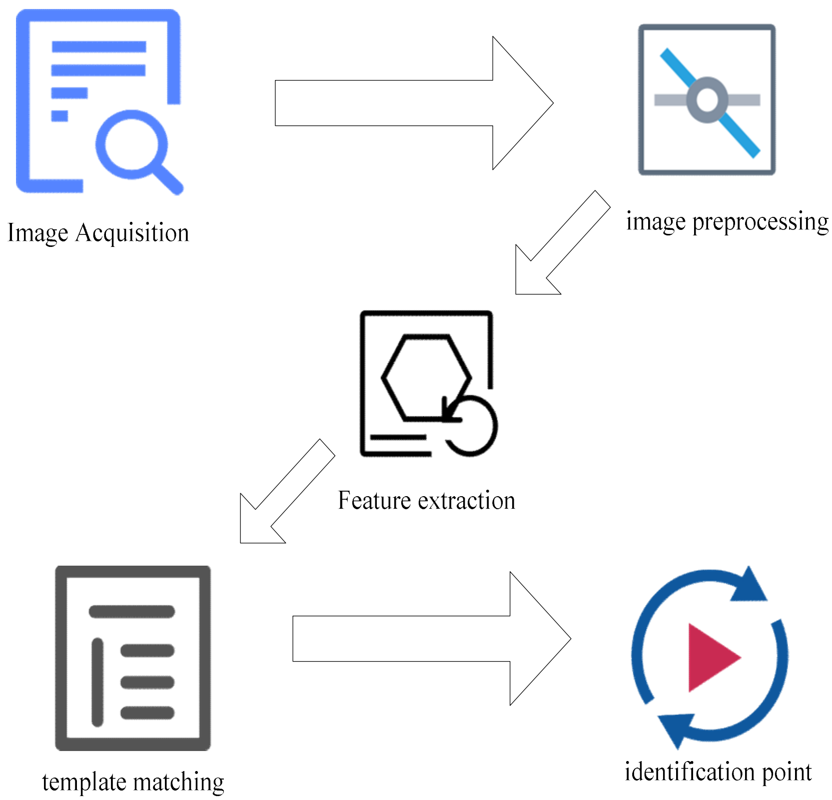


Figure 2: Identification process of identification points

The identification process of the logo is shown in Figure 2. The framework gets the picture data of the actual world climate through the camera. Working on the exactness of ID and situating algorithms is fundamental, and to pre-process the collected image information to reduce the influence of interfering elements. In order to consider the accuracy and operational efficiency of the feature extraction process, the target region of interest should be correlated with the template after extraction. The algorithms currently adopted include the method of calculating the squared difference and the method of calculating the correlation coefficient for matching, so as to complete the identification and positioning of the identification points [13].

II. C.Image Preprocessing

The image preprocessing module is very necessary in processing image information, because images are collected by cameras in different application scenarios. Therefore, there will be some interference factors, which are caused by many reasons, such as the influence of the actual environment, the influence of the shooting angle and the distance, which will cause a certain degree of interference. For the accuracy of subsequent steps, image preprocessing steps should be performed, and the image preprocessing process is shown in Figure 3.

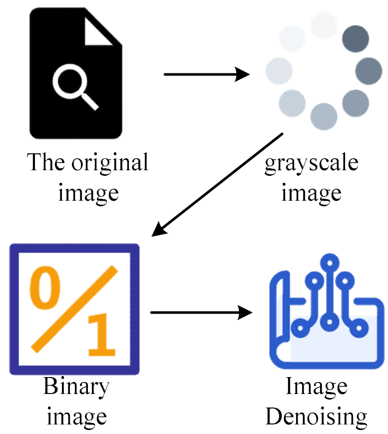


Figure 3: Image preprocessing process

As can be seen from Figure 3, since the original images obtained from the digital camera are in the format of RGB model, and the logo point graphics are composed of black and white. Most of the algorithms are for grayscale images, so the captured color video images need to be grayscaled and finally converted into grayscale images. In this paper, the weighted average value method is used for processing, and finally a processed image with only 0 and 1 needs to be obtained, showing the effect of black and white that is conducive to distinguishing, which can greatly simplify the image, making identification easier and without affecting the character of the marker dot pattern [14]. The ultimate goal is to improve the accuracy of recognition and localization, since denoising steps on the image can reduce interference and improve efficiency.

II. D.Feature Extraction

The accuracy and efficiency of the feature extraction module directly affect the performance of the augmented reality system. Therefore, the current research focus is the accuracy of the feature extraction algorithm, thereby improving the real-time performance of the system. After image binarization, a black and white image with only 0 and 1 is obtained. In order to obtain the connected area in the picture, the connected area algorithm is used for processing, and the image processed by the connected area labeling algorithm will obtain each candidate connected s area set. If the area is too small, the connected area is discarded, as shown in Figure 4.

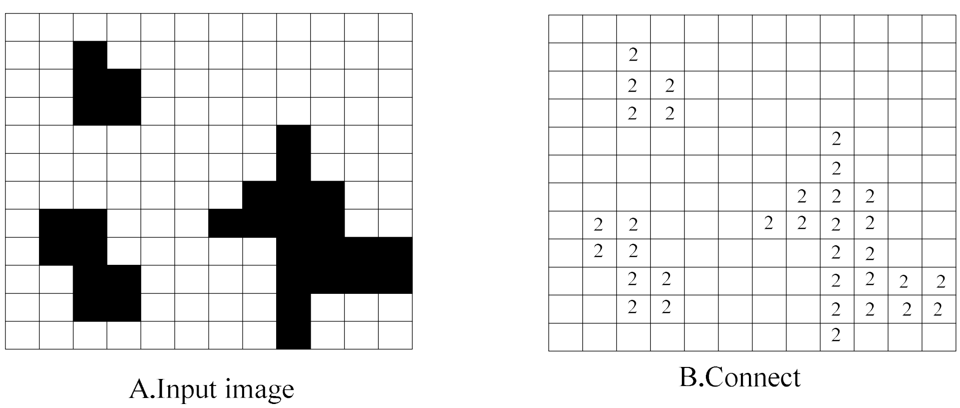


Figure 4: Input image and connected region labeling algorithm results

Figure 4 shows the input image after the image is binarized and denoised, and the image is divided into two different areas, the white area and the black area. Figure 4B shows that the black areas in the processed image are marked and numbered, in order to distinguish different black areas, so as to provide convenience for subsequent algorithm processing. After the connected area identification processing, the image is divided into different areas, and then the connected area boundary tracking is performed on the divided area, and each candidate area boundary will be obtained through the connected area boundary exploration [15].

II. E. Matting Algorithm Based on AR Technology

In this paper, a matting algorithm based on shared sampling is used to extract foreground images, which takes into account both accuracy and speed, and can provide effective prior knowledge for subsequent processing [16], [17]. Separating and combining forefront objects are crucial activities in picture and video handling. The reason for computerized picture matting handling is to precisely remove frontal area objects from pictures and recordings. Accordingly, the matting method needs to assess the closer view variety F, foundation variety B and darkness alpha worth of all pixels in a picture. These values can be represented by the following equation 1 to express the relationship between them:

$$C_p = a_p F_p + (1 - a_p) B_p \tag{1}$$

The algorithm needs to choose a pair of foreground and background sample points whose linear combination can simulate point p as closely as possible. The algorithm uses the color distortion degree M to measure the similarity of the simulation, and for the best sampling point pair M, the value of M is as small as possible. The formula is as follows:

$$M_p(F_i, B_i) = \left\| C_p - (a_p F^i + (1 - a_p) B^i) \right\| \tag{2}$$

So the best sampling point should minimize the squared error:

$$N_p(f_i, b_j) = \sum_{i, f \in \Omega_p} M_q(F^i, B^j)^2 \tag{3}$$

The probability that the unknown point p belongs to the foreground image can be represented by $E_p(s)$, as follows:

$$E_p(s) = \int_L \left\| \nabla I * dr \right\|^2 \tag{4}$$

$$PF_p = \frac{\min_{j(} E_p(b_j))}{\min(E_p(f_i) + \min_j(E_p(b_j)))} \tag{5}$$

Therefore, the above formula states that if the minimum energy value of an unknown point p to the foreground sampling point is much smaller than its minimum energy value to the background sampling point, then the value of PF_p will be close to 1. This shows that the location point p has a higher probability of being a point in the foreground area, therefore:

$$A_p(f_i, b_j) = PF_p = (1 - 2PF_p)\hat{a}_p \tag{6}$$

The final objective function of the algorithm takes into account the luminosity and spatial similarity as well as statistical information to select the best foreground and background sampling points, as follows:

$$g_p(f_i, b_j) = N_p(f_i, b_j)^{eN} A_p(f_i, b_j)^{eA} D_p(f_i)^{ef} D_p(b_j)^{eb} \tag{7}$$

In this formula, the distance between the foreground sampling point and the background sampling point and the unknown point p should be as close as possible. Therefore, for the unknown point p, the best sampling point-to-$g_p(f_i, b_j)$ algorithm calculates the values of all its sampling points, and the algorithm selects the smallest one, which is expressed by the following formula.

$$(f_p, b_p) = \arg\min_{f,b} g_p(f_i, b_j) \tag{8}$$

Therefore, from the above it can be gotten:

$$\sigma_t^2 = \frac{1}{N} \sum_{q \in \Omega_t} \left\| C_q - F_p^g \right\|^2 \tag{9}$$

$$\sigma_t^2 = \frac{1}{N} \sum_{q \in \Omega_b} \left\| C_q - B_p^g \right\|^2 \tag{10}$$

Sampling refinement stage: For a small value of k, when sampling the foreground and background points for the unknown point p, there may not be a sufficient number of pixels to effectively estimate the estimated alpha value and the color values of the front and back background. Therefore, an extended search is required near the unknown point p to share the best results [18], [19]. Another tuple obtained in the sampling refinement stage for the point p in the unknown region is as follows:

$$\tau_p^r = (F_p^r, B_p^r, a_p^r, f_p^r) \tag{11}$$

F_p^r, B_p^r, a_p^r, and f_p^r in the formula are respectively expressed as:

$$F_p^r = C_p \qquad if \left\| C_p - F_p^g \right\|^2 \le \tilde{\sigma}_f^2 \tag{12}$$

$$F_p^r = \tilde{F}_p^g \qquad otherwise \tag{13}$$

$$B_p^r = C_p \qquad if \left\| C_p - B_p^g \right\| \le \sigma_b^2 \tag{14}$$

$$B_p^r = \tilde{B}_p^g \qquad otherwise \tag{15}$$

$$a_p^r = \frac{(Cp - B_p^r) * (F_p^r - B_p^r)}{\left\| F_p^r - B_p^r \right\|^2} \tag{16}$$

$$f_p{}^r = \exp\left\{ -\lambda M_p(\tilde{F}_p^g, \tilde{B}_p^g) \right\} \qquad ifF^r{}_p \ne B_p^r \tag{17}$$

$$f_p{}^r = \varepsilon \qquad ifF^r{}_p = B_p^r \tag{18}$$

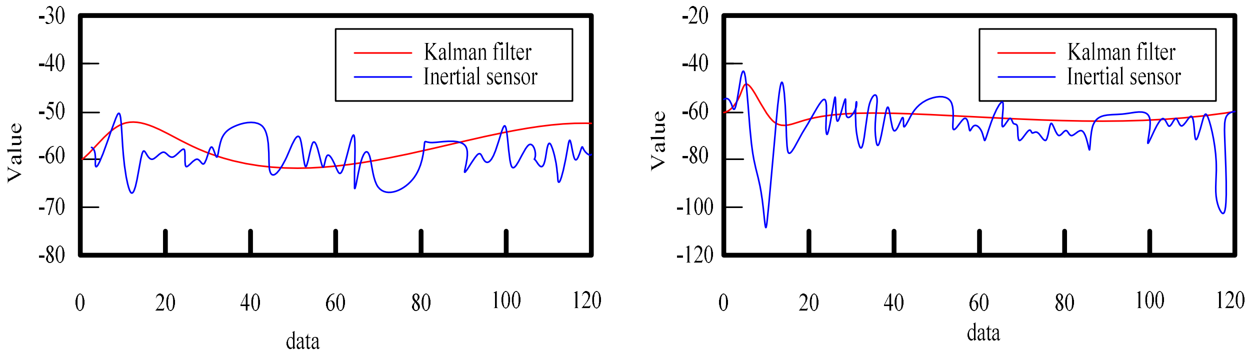
Here, the superscript r represents the value computed during the sampling refinement stage. The meaning of the calculated value of F_p^r is that if the color of the pixel p in the unknown area is very close to the average of the three best foreground sampling points obtained in the sampling stage, then the value of C_p is used to replace the value of F_p^r in order to keep the original color. Do the same for B_p^r, the value of a_p^r is obtained by calculating the projection length of vector $(C_p - B_p^r)$ on vector $(F^r{}_p - B_p^r)$ using the previously calculated foreground and background colors.

III. AR Technology Experiment under Digital Media Art

III. A. Image Feature Matching Based on AR Technology

With the increasing application of augmented reality technology in the mobile field, people have begun to put forward higher requirements for the intuitive feeling brought by various applications. In real scenes, because different scenes often move relative to each other, lighting conditions change over time, and viewing angles often change. These objective factors all bring more challenges to the realization of augmented reality systems [20]. For augmented reality systems, accurate 3D tracking registration is the core issue.

Android's product improvement pack furnishes application designers with capabilities that permit applications to utilize the gadget's sensors to acquire gadget direction data. However, due to the influence of the electromagnetic field on the smartphone in the outdoor environment, the data measured by the accelerometer and the magnetometer have obvious jitter noise. Therefore, this paper uses Kalman filter to filter the signal obtained by the sensor to obtain the direction estimation result without jitter and offset, where Kalman's pre-measurement is the data measured by the gyroscope, and the measurement value is the data obtained by the accelerometer and the magnetometer. Its data value statistics chart is shown in Figure 5:



(a) Data values under smooth motion of the device

(b) Data values under vigorous exercise of the device

Figure 5: Comparison plot of data under different conditions

As can be seen from Figure 5, Figures 5(a) and 5(b) show the results obtained for the smartphone's accelerometer and magnetometer under stable and intense working conditions, respectively. They are sifted with a Kalman channel. For simplicity of examination, the flat hub addresses time, and the upward hub addresses the precise shift in the X-hub course comparative with the recently characterized heading. It can be seen from the figure that a simple compensation filter can be used to obtain direction values without jitter and drift. In order to make the Brief descriptor have rotation invariance, a rotation variable R, needs to be added to the matrix A, and the rotation variable R is obtained by the built-in sensor of the mobile device.

III. B. Experimental Results

In this section, three performance evaluation indicators are used to conduct experimental analysis of the RBRIEF feature descriptor, namely the matching success rate, time complexity and space complexity. The experiment was carried out on a PC with OpenCV 2.4.10 and Visual Studio 2013 software installed, 4G memory, 1.60GHZ CPU frequency, and Windows operating system.

(1) Matching success rate

The matching achievement rate is characterized as the right matching rate between the first picture and the objective picture, or at least, the proportion of the quantity of accurately paired highlight focuses to the all out number of element points of the picture with less component focuses. Here first, a classic Lena image is taken as the target image, and the image with the size of 120×120 pixels at the center of the target image is used as the template image. By rotating the target image from 0 degrees to 180 degrees, the feature points are matched at different angles. Brief, ORB and the proposed RBRIEF are compared in the experiments, and the experimental results are shown in Figure 6.

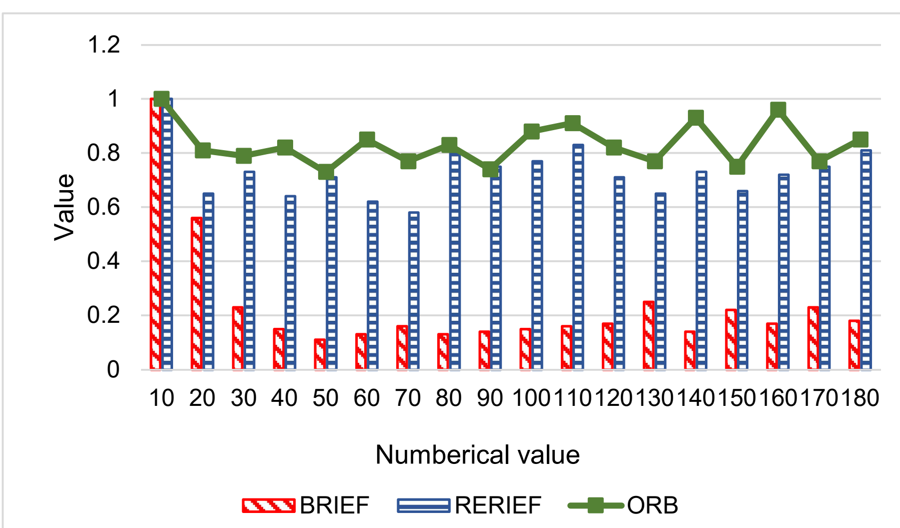


Figure 6: Feature point comparison of three algorithms in image matching

It tends to be seen from Figure 6 that the matching achievement pace of the RBRIEF useful descriptor is higher than that of the Circle utilitarian descriptor and the Concise practical descriptor. The ORB algorithm needs to calculate the orientation of the feature points before forming the feature descriptor, so the ORB descriptor contains the orientation characteristics of the feature points and has rotation invariance. Its main direction is defined as the direction from the feature point to the particle in the circular neighborhood of the point, but the overall performance is still slightly worse than the RBRIEF feature descriptor. In any case, since the Concise parallel descriptor has no pivot invariance, as the revolution point of the objective to be matched builds, the matching precision turns out to be endlessly lower, lastly moves toward 0.

(2) Time complexity

The time complexity is defined as the sum of the description time and the matching time of the feature points after detecting the feature points of the target image and the template image. To evaluate the temporal metrics of feature descriptors, 10 graphs with different numbers of feature scores were selectedfor testing. ORB, SIFT, SURF and RBRIEF were used to describe and match feature points. In order to eliminate the influence of feature point detection time, all feature point descriptors here use the CenSurE method for feature point extraction. The experimental results are shown in Figure 7, where the Y-axis uses a logarithmic scale to make data comparison more intuitive.

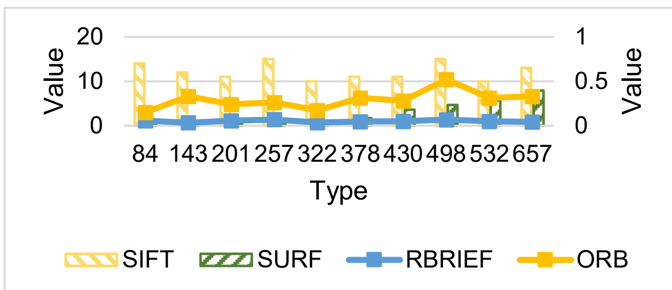


Figure 7: Time consumption comparison of different descriptors

It very well may be seen from Figure 7 that the tedious of the RBRIEF highlight descriptor is not exactly that of the other three descriptors. Additionally, the depiction and matching season of element focuses are for the most part directly connected with the quantity of component focuses, and the time intricacy is O(n), where n addresses the quantity of element focuses. The local fluctuations in the figure may be caused by the execution strategy of the CPU and other reasons.

(3) Average time of motion estimation

The typical season of movement assessment is characterized as the time expected to compute the ideal change between the layout picture and the objective picture, which is equivalent to the time expected for every emphasis of the computation increased by the quantity of emphasess expected for each edge. Video outline B keeps on being utilized for tests, and the trial results are displayed in Table 1.

Table 1: Comparison of motion estimation time for different algorithms

tracking algorithm	A total of 1075 frames, the frame rate is 30fps, the unit is ms			
ESM	Average motion estimation time	Minimum motion estimation time	Maximum motion estimation time	variance
Inertial KLT	9.74	2.36	75.25	20.24
PhonyFems	28.25	7.53	107.41	35.26
ESM-SG-MB	25.45	5.17	93.86	28.31
tracking algorithm	13.83	2.58	80.14	15.53

It can be seen from Table 1 that the maximum (small) value of the motion estimation time in the table is defined as the longest (shortest) time in all the motion estimation time sets of the video frame, and the variance represents the stability of the time required for motion estimation. It can be seen from the table that the computation time of the ESM algorithm is the least, followed by ESM-SG-MB. And the ESM and ESM-SG-MB algorithms are more stable than the other two algorithms.

Table 2: Runtime schedules of four different contrast modulation algorithms

algorithm	Average time to run the algorithm (ms)		
IGSLO	video frame 1	video frame 2	video frame 3
SCLM	426.4	582.2	479.6
sCGM	1311.5	2415.8	2219.7
Proposed	18475.6	24944.1	24113.5
algorithm	276.7	372.3	315.1

Table 3: Memory footprint results for four different contrast modulation algorithms

algorithm	The memory footprint of running the algorithm (K)		
IGSLO	video frame 1	video frame 2	video frame 3
SCLM	3897	3654	3233
sCGM	2156	2323	2650
Proposed	6578	6723	6937
algorithm	327	380	352

It can be seen from Table 2 and Table 3 that the algorithm proposed in this chapter has advantages over other algorithms in terms of running time and memory usage, and is more suitable for use in the museum navigation system under digital media art.

IV. Museum Tour System Design Under Digital Media Art Under Digital Media Art

The museum tour system based on mobile augmented reality digital media art consists of audio picture module, video module, augmented reality module and positioning module. These modules basically meet the problems encountered by tourists visiting museums under digital media art, and can further expand the information of exhibits from audio, picture, video and three-dimensional display to make up for the current single mode of exhibit interaction in museums under digital media art , which increases the pleasure of the tour. This is beneficial to the current demand for museum construction under digital media art, and to improve the educational function of museums under digital media art. Therefore, the system needs to be improved from the following modules to meet most of the needs, and can also provide a good user experience. The functional structure is shown in Figure 8.

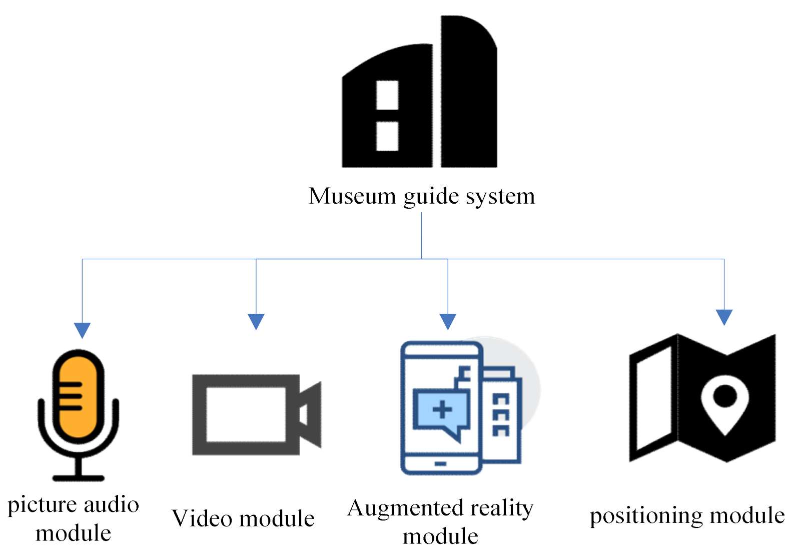


Figure 8: Functional block diagram

IV. A. Augmented Reality Module and Positioning Module

As an important part of the system, the augmented reality module is mainly implemented by the improved algorithm in this paper. This module provides visitors with a user experience that integrates virtual and real. Visitors can appreciate the 3D model of the exhibits by obtaining the artificial signs next to the exhibits, so that some precious exhibits can be enjoyed at their fingertips. The business flow chart of the augmented reality module is shown in Figure 9.

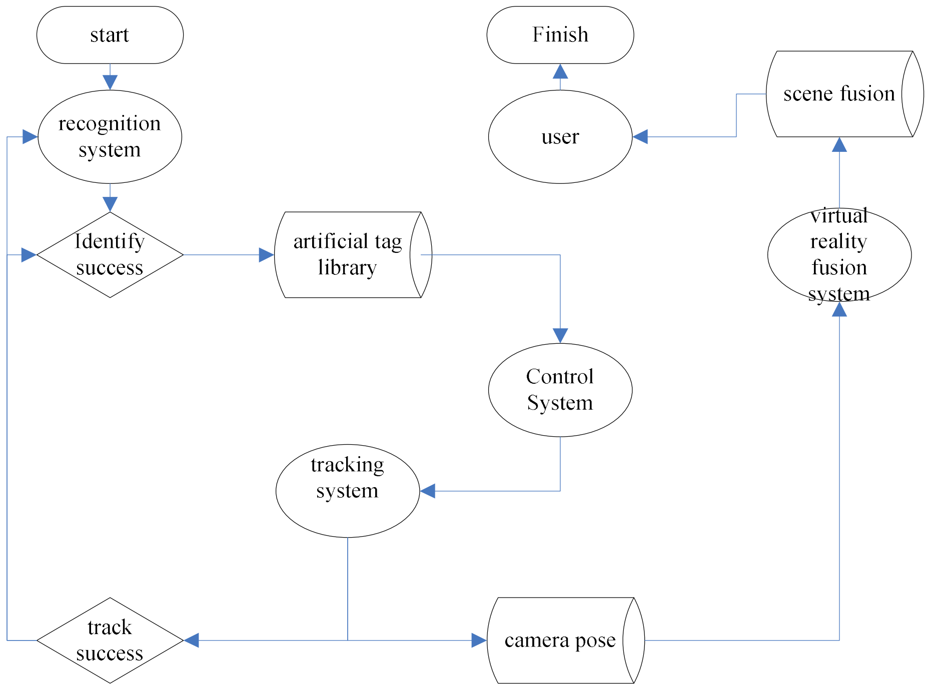


Figure 9: Augmented Reality Module Business Flow Diagram

As can be seen from Figure 9, from the structural point of view, the augmented reality module is composed of four functions: identification, tracking, registration, and combination of virtual and real. The identification function needs to call the Android mobile phone camera function and the corresponding background image processing function, so as to realize the subsequent functions.

IV. B. Picture Audio and Video Module

The picture audio module consists of pictures, text introduction and audio. The functional structure of the picture audio module is shown in Figure 10.

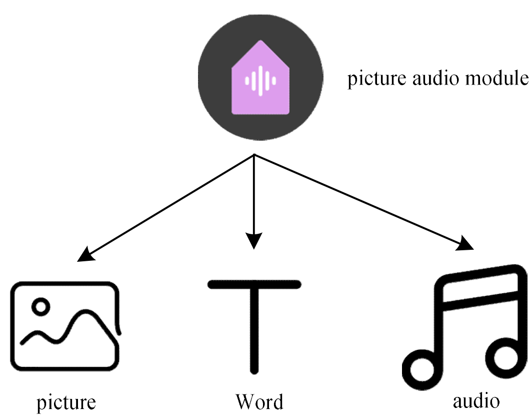


Figure 10: Picture audio module structure

As can be seen from Figure 10, the picture and audio module mainly conveys the information of the exhibits to the tourists through these three methods, so that the tourists can understand the information of the exhibits in detail. The video module conveys the information behind the exhibits and relevant historical facts to visitors through video.

V. Conclusions

AR technology can optimize the process of museum exhibition design and arrangement under the digital media art of digital media art. The museum exhibition design and installation process under the traditional digital media art is a sequential process. After the work of one department is completed, other departments start work. The working time line is long, the work content and process are complicated, and the personnel of various departments cannot be fully called. Often when a department works, people are seconded from other departments. The seconded personnel have no professional knowledge base for other departments' work, which is very laborious and error-prone. However, the more professional work content of this department only accounts for a small part of the exhibition process, and the personnel waste and work burden are serious. The emergence of AR technology can simplify the workflow of exhibition design and exhibition design, and bring a more scientific operation process to exhibition design and exhibition design. And it can help guide the work of various departments, reduce the workload and reduce the participation of the departments, so that the staff of the museum under the digital media art can perform their own duties and make the design work easier. However, there are still some deficiencies in the research on it. Due to the lack of data collection in this paper and the inability of equipment to follow up the subsequent research, the constructed system still has the problems of incomplete functions and inability to adapt to local conditions. In the following research, the research can start with the system itself, and optimize the system so that it can be put into the museum exhibition under the digital media art of digital media art.

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