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Research Article

Performance of VR Technology in Environmental Art Design Based on Multisensor Information Fusion under Computer Vision

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Multisensor information fusion technology is a symbol of scientific and technological progress. This paper is aimed at discussing the performance of virtual reality (VR) technology in the environmental art design of multisensor information fusion technology. This paper prepares some related work in the early stage and then lists the algorithms and models, such as the multisensor information fusion model based on VR instrument technology, and shows the principle of information fusion and GPID bus structure. This paper describes the multisensor information fusion algorithm to analyze DS evidence theory. In the evidence-based decision theory, the multisensor information fusion process is the calculation of the qualitative level and/or confidence level function, generally calculating the posterior distribution information. In addition to showing its algorithm, this paper also shows the data flow of the multisensor information fusion system through pictures. Then, this paper explains the design and construction of garden art environment based on active panoramic stereo vision sensor, shows the relationship of the four coordinates in an all-round way, and shows the interactive experience of indoor and outdoor environmental art design. Then, this paper conducts estimation simulation experiments based on EKF and shows the results, and it is concluded that the fusion data using the extended Kalman filter algorithm is closer to the actual target motion data and the accuracy rate is better than 92%.

1. Introduction

Multisensor information fusion is the process of integrating incomplete information from the local environment. This local environment is equipped with similar or nonuniform sensors to create a relatively complete and consistent understanding of the system environment, thereby improving network decision-making, planning, and response. The research and development of multisensor information fusion have received more attention. Cyber weapon systems must operate in a variety of unstable environments. This uncertainty is not limited to the process of identifying and describing the environment. And in the process of decision-making and implementation, the premise of the network weapon system performing various tasks in an unknown environment is that its perception system must be able to accurately and dynamically identify the environment. The application of VR technology in environmental art design can not only help designers better explore global opportunities but also inspire designers to create new ideas and innovations in an interactive environment, as well as develop creative designs and tools. Its rich creative expression works from the initial concept stage of a design to the final impact stage. Although the application of existing VR technology in environmental art design has not been fully developed and is still under research, with the continuous development of technology, its role and influence will undoubtedly increase. Combining information with multiple sensors, VR technology can improve the accuracy of position modeling and calculations with amazing results.

The innovation of this paper is reflected in the comparison of Kalman and complementary fusion filtering, and the performance superiority of Kalman filtering is obtained. This paper applies multisensors to the pose calculation of

VR technology, and exemplifies the application of VR technology in environmental art design. It finally reflects the developability of the experiment with better data.

The significance of this paper is to combine the multisensor information fusion technology to improve the positioning of VR technology and to find an excellent way to apply it. It has practical significance in environmental art design, which makes the application of VR technology in environmental art more promising.

2. Related Work

Liu et al. proposed another strategy for multisensor data combination shortcoming finding in light of BP neural organization and D-S proof hypothesis for the issue of fragmented data and vulnerability in single-boundary complex framework conclusion [1]. Aiming at the problems of low accuracy, high deployment and maintenance cost, insufficient robustness, and low sensor utilization of existing indoor positioning algorithms, Xiangyu et al. proposed a particle filter algorithm based on multisensor fusion [2, 3]. Yang and Na first perceived obstacle information through sensors and fuse the information as neural network input. Secondly, they combined BP neural network and fuzzy theory. They applied the fuzzy neural network to the vehicle obstacle avoidance system, improved the BP neural network, and used the improved fuzzy neural network to process the fusion data [4]. On the basis of building a multisensor cluster database, Ouyang et al. combined the improved fuzzy theory with the trajectory association algorithm based on D-S evidence decision-making. They performed a multisensor fusion algorithm for the designed 3D boundary monitoring system [5]. Marks et al. accepted that ecological workmanship can assemble understanding by trading thoughts and giving discourse, laying out a feeling of spot, which explain and upgrade comprehension of data and issues, and draw consideration [6]. Yeqiu and Zhu suggested the uniqueness and regionality of “design culture” in the Chinese context through the study of the Chinese environmental (art) design name dispute [7]. Yeqiu and Zhu proposed the uniqueness and regionality of “plan culture” in the Chinese setting through the investigation of the Chinese natural (craftsmanship) plan name question [8]. Haoran coordinated precise investigation and examination on the appearance change and practice of model arrangement and creation in the regular workmanship plan distinguishing strength [9, 10]. Li and Hou investigated the structural plan and inside beautification in view of VR innovation and programmatic experience stage [11]. Li et al. concentrated on the standards of 3D liveliness delivering programming and 3D illustrations demonstrating and planned and created a three-layered 3D model showed in a computer generated simulation scene [12]. Shirinkina dissected the augmented experience industry to feature the fundamental pieces of the innovation [13]. Richardson and Howey expressed that a twofold expanded Kalman channel (DEKF) in light of a similar warm model and impedance estimation input is equipped for assessing the convection coefficient at the cell surface when the last option is obscure [14]. Bai et al. proposed a lengthy state-based Kalman channel for better vigor and higher assessment precision [15]. Phuong et al. assessed the presentation and adequacy of control plans to give valuable and complete Kalman channel and unsettling influence onlooker plans in different movement control applications [16]. Wang and Xia presented the Desensitized Extended Kalman Filter (DEKF). The state gauge for DEKF is acquired by limiting an expense work comprising of the hint of the back covariance lattice and the weighted standard of the back state assessment mistake awareness (PSEES).

3. Model and Algorithm

3.1. Multisensor Information Fusion Model. The main components of a virtual instrument are software, hardware, and its interface modules, and the software part is the most important part of the virtual instrument. The four advantages of virtual instrument technology are high performance, strong scalability, less development time, and excellent integration. Due to the rapid development of the network, virtual instruments have entered the era of networking [17]. With the support of the network, compared with the PC-based virtual instrument, the networked virtual instrument has higher flexibility and diversity and has made significant progress in data resource sharing. The change of the output value of the sensor is affected by a variety of factors, and a single parameter cannot determine the final trend of the output value. Therefore, the sensor has a certain cross-sensitivity. Therefore, when other parameters change, the output value will also be affected, resulting in the unstable performance of the sensor. The emergence of multisensor fusion technology is to reduce the influence of each parameter on the output value of the sensor and improve the stability of its performance and measurement accuracy. The experiment in this paper mainly tests the output voltage and loading pressure of the pressure sensor and temperature sensor and also measures the temperature, and other parameters of the environment where the sensors are located. It is assisted by information fusion technology to eliminate the interference of parameters such as temperature, so as to improve the measurement accuracy of sensor-related voltage parameters. Figure 1 shows the related principle. The whole experiment consists of two parts: software and hardware. On-site measurement and control software and remote measurement and control software form the software part. Among them, the on-site measurement and control software will perform real-time monitoring, analysis, and storage on the local server transmit the obtained data to the remote client. The remote measurement and control software mainly receives and saves the relevant data and sends remote commands.

From the analysis of the content, the virtual system consists of two parts: software and hardware. And if it is analyzed from the perspective of composition, it can be known that there are PC-DAQ test systems, VXI systems, and PXI systems composed of signal conditioning and DAQ boards. The instrument used in the utility has both GPIB and RS-232 serial ports. To meet the required number of RS-232 serial ports, three instruments need to be connected.

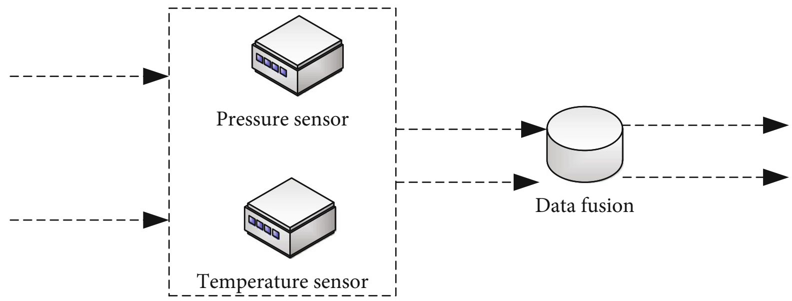

Figure 1: Principle of information fusion.

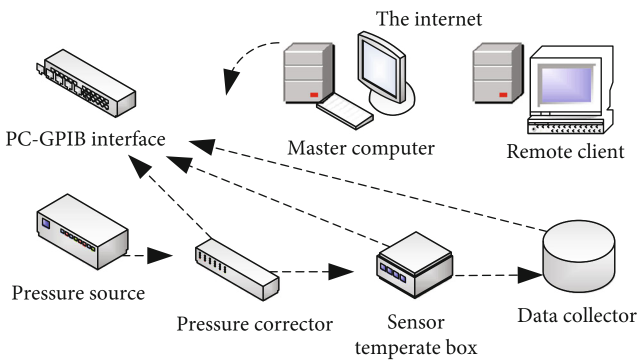

Figure 2: GPIB bus structure.

Therefore, the system is constructed through GPIB, as shown in Figure 2.

The hardware part is mainly composed of main control computer, NI product PC-GPIB interface card, DC voltage regulator, temperature sensor, and DHPPC2+ pressure calibrator. At the beginning of the experiment, the pressure source outputs a certain pressure value to the pressure calibrator, and the pressure value is lower than the rated value of the calibrator by 100KP, and the calibrator transmits the correct pressure value to the sensor. At this time, the temperature of the incubator is set through the relevant instrument panel, and the sensor gives the corresponding pressure voltage and temperature voltage signal according to the different set temperatures. It then obtains the digital signal through the data acquisition instrument and inputs the signal into the main control computer through the PC-GPIB interface card.

3.2. Multisensor Information Fusion Algorithm-D-S Evidence Theory. Under normal circumstances, it is habitual to use the method of improving evidence reasoning to optimize the formula used in Dempster's evidence combination. Evidence theory satisfies weaker conditions than Bayesian probability theory. It has the ability to directly express "unsure" and "do not know." And in the application process of this method, the weighted allocation conflict method or the absorption method can be used to solve the larger conflicts that exist at present. It is located in the departure field of essential observation. It can be seen that the principle of the two is to improve the original formula by weighting, but there will also be cases where the characteristics of exchangeability and associativity are lost, and the consequences of the two may be the same. In this state, its high conflict problem itself has undoubtedly not been completely resolved. It assigns a corresponding proposition to each sensor and maps each sensor to its decision. At the same time, based on the information collected by each sensor, an appropriate confidence level function is finally established. Therefore, it can regard the information fusion of multiple sensors as the process of combining different evidence combinations under the same recognition framework into a new evidence body. In the decision target set of the information fusion system, there are some nonfusion targets. When the sensor observes the environment, the information obtained by the sensor can obtain the corresponding confidence level in the target set, and the obtained confidence level becomes an important basis for decision-making.

According to the evidence decision theory, the multisensor information fusion process is the calculation of confidence level, likelihood function, and confidence level function. There are three architectures of information fusion system: distributed, centralized, and hybrid. Let the confidence level of the decision targets corresponding to v sensors be u, and the posterior credibility distribution obtained through continuous target situation estimation and prior assignment is

$$U_1(S_k), U_2(S_k), \cdots, U_v(S_k), \quad k = 1, 2, \cdots i. \tag{1}$$

Among them, $U_j(S_k)$ represents the reliability distribution value of cycle j to proposition S_k. It can be seen that the posterior reliability distribution of the fusion information of i propositions by the evaluated value of its sensor is

$$\begin{aligned} U(S_k) &= \lambda^{-1} \sum_{\cap S_j = S_k} \prod_{1 \le w \le v} U_w(S_k), \quad k = 1, 2, \cdots, i, \\ \lambda &= 1 - I = 1 - \sum_{\cap S_k = \varphi} \prod_{1 \le w \le v} U_w(S_k) = \sum_{\cap S_k \ne \varphi} \prod_{1 \le w \le v} U_w(S_k). \end{aligned} \tag{2}$$

The evidence conflict factor is I, and the posterior credibility distribution of the multisensor information fusion of the unknown proposition is

$$m = \lambda^{-1} m_1 m_2, \cdots, m_v. \tag{3}$$

After completing the procedure, the information fusion of multiple sensors in multiple cycles can be calculated, and the number of sensors is u. At this time, the posterior confidence distribution of each sensor is

$$U_{wj}(S_k),\quad k=1,2,\cdots,i\,;j=1,2,\cdots,v\,;w=1,2,\cdots,u, \tag{4}$$

$$m_{wj}=U_{wj}(\Omega),\quad j=1,2,\cdots,v\,;w=1,2,\cdots,u. \tag{5}$$

The unknown m_{wj} in formula (5) represents the credibility assignment of the unknown proposition. Here, $U_{wj}(S_k)$ represents the posterior information of the proposition of the wth sensor in the jth measurement period S_k, and the posterior credibility distribution of each sensor after information fusion can be calculated as

$$\begin{aligned}U_w(S_k)&=\lambda_w^{-1}\sum_{\cap S_j=S_k}\prod_{1\le w\le v}U_{wj}(S_k),\quad k=1,2,\cdots,i,\\ \lambda_w&=1-I=1-\sum_{\cap S_k=\varphi}\prod_{1\le w\le v}U_{wj}(S_k)=\sum_{\cap S_k\neq\varphi}\prod_{1\le w\le v}U_{wj}(S_k).\end{aligned} \tag{6}$$

The posterior confidence distribution of the unknown proposition at this time is:

$$m_w=\lambda_w^{-1}m_{w1}m_{w2},\cdots,m_{wv}. \tag{7}$$

Let u sensors be a sensor system; we get

$$\begin{aligned}U(R)&=\lambda^{-1}\sum_{\cap S_k=R}\prod_{1\le w\le u}U_w(S_k),\quad k=1,2,\cdots,i\,;R\subseteq\Omega,\\ \lambda&=1-I=\sum_{\cap S_k\neq\varphi}\prod_{1\le w\le v}U_w(S_k).\end{aligned} \tag{8}$$

The posterior credibility distribution of the unknown proposition at this time is formula (3), and then, distributed computing is used to calculate the posterior credibility distribution of the sensor fusion information:

$$\begin{aligned}U_j(R)&=\lambda_j^{-1}\sum_{\cap S_k=R}\prod_{1\le w\le u}U_{wj}(S_k),\quad k=1,2,\cdots,i\,;R\subseteq\Omega,\\ \lambda_j&=\sum_{\cap S_k\neq\varphi}\prod_{1\le w\le v}U_{wj}(S_k).\end{aligned} \tag{9}$$

From an objective point of view, the performance of each sensor is different, so the ability of the sensor to recognize the target is also different. For example, when a magnetic sensor works, it can only sense certain materials. However, if the awakened microbattle unit is to be perceived, it cannot be directly identified, but the information between the units needs to be fused. And it uses the method of evidence theory information fusion to carry out the judgment of joint attributes, so as to accurately judge the target attributes.

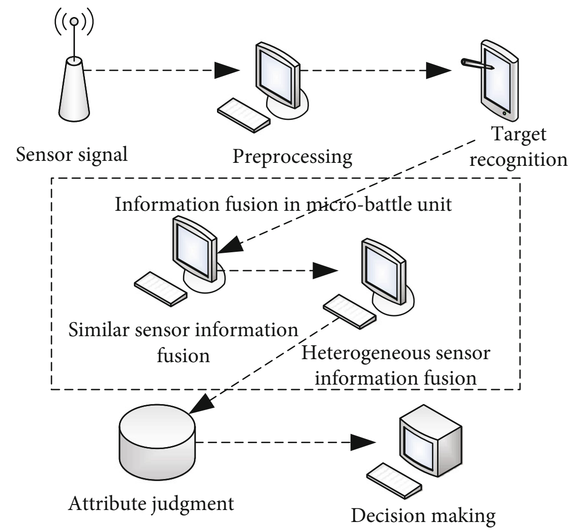

Figure 3: Data flow of multisensor information fusion system.

Figure 3 shows the data flow of the multisensor information fusion system:

Different sensors will work normally with their own specific output forms and generate unique information at the same time. If all sensors are connected to a single information fusion center, it will have a significant impact on the effectiveness of the sensors. The microcombat unit can process its characteristics in a targeted manner, thereby reducing the load of system information fusion and improving the processing speed.

The credibility distribution value is calculated based on the carrier in the D-S evidence theory. Let V be the number of target types, U be the number of sensors in the system, and set $Q_k(c_j)$ as the correlation coefficient to obtain

$$\begin{aligned}\alpha_k&=\max\left\{Q_k(c_j)\,|\,j=1,2,\cdots,V\right\},\\ \beta_k&=\frac{V\varepsilon_k}{\sum_{j=1}^{V}Q_k(c_j)},\quad k=1,2,\cdots,U,\\ \psi_k&=\frac{\beta_k-1}{U-1},\quad U\ge 2,k=1,2,\cdots,U,\\ F_k&=\frac{\varepsilon_k-1}{U-1},\quad U\ge 2,k=1,2,\cdots,U.\end{aligned} \tag{10}$$

The reliability distribution of the sensor to the target can be calculated as follows:

$$u_k(c_j)=\frac{Q_k(c_j)}{\sum_{j=1}^{V}Q_k(c_j)+V(1-F_k)(1-\varepsilon_k\alpha_k\psi_k)}. \tag{11}$$

The uncertainty is:

$$\varpi_k=\frac{V(1-F_k)(1-\varepsilon_k\alpha_k\psi_k)}{\sum_{j=1}^{V}Q_k(c_j)+V(1-F_k)(1-\varepsilon_k\alpha_k\psi_k)}. \tag{12}$$

The algorithm is implemented on MATLAB.

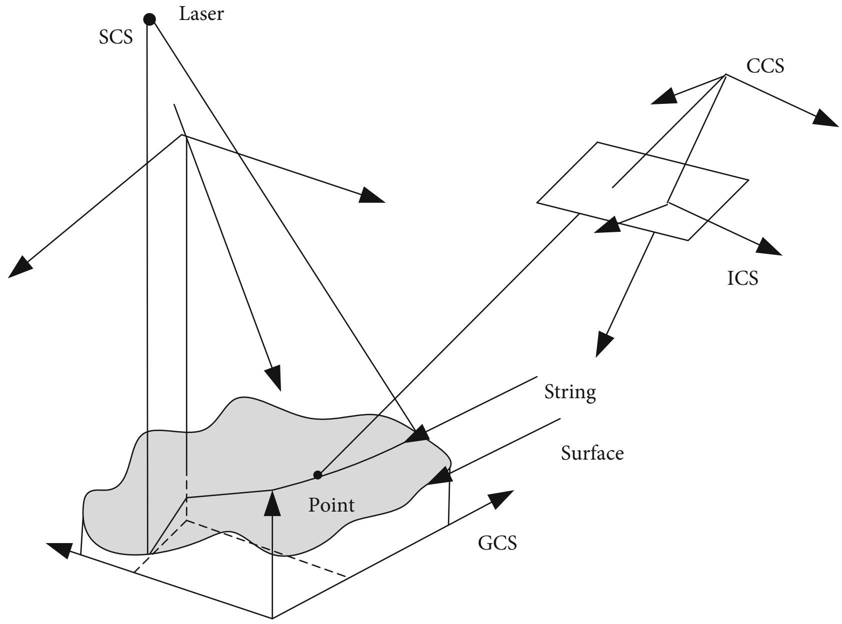

Figure 4: Four coordinate system relationships.

3.3. Design and Construction of Garden Art Environment. In the process of 3D reconstruction, a variety of coordinate systems are generally used, namely, the world coordinate system, the panoramic camera coordinate system, the digital image plane coordinate system, and the moving surface laser generator coordinate system. The working principle of the panoramic camera includes two core processes, namely, calibration and linkage. Since the camera, the measured object, and the laser generator are not in the same spatial position, the four coordinate systems cannot be coincident, vertical, or parallel. Therefore, in the process of measurement and reconstruction, it is necessary to form an appropriate relationship between each coordinate system by means of registration and transformation. The object is in the world coordinate system and is finally imaged in the digital image coordinate system through the joint processing of multiple coordinate systems. Through ASODVS processing, the four coordinate systems can be unified, and the subsequent process of scene model establishment and other processes does not need to perform coordinate system conversion again. Therefore, the processing complexity of the process is significantly reduced, and the accuracy is also effectively improved. Its coordinate relationship is shown in Figure 4.

The successful construction of the ASODVS system mainly relies on omnidirectional vision sensors and moving surface laser generators. In addition to the two instruments of the volume, it also includes various modules, such as a drive module, an operation module, and the like. In this system, the omnidirectional vision sensor is mainly responsible for capturing a panoramic image corresponding to a specified scene. The operation module has more responsibilities, such as controlling the laser and collecting and storing 3D point cloud data. ODVS uses a hyperboloid lens and a conventional camera (CCD) to achieve catadioptric imaging technology and follows the principle of single viewpoint. There are other methods for obtaining panoramic video images, such as multicamera integration. To achieve catadioptric imaging technology, omnidirectional vision sensors must rely on hyperboloid lenses and CCDs. In addition to obtaining panoramic images through ODVS, there are other ways, such as multiple camera combination shooting and fisheye camera shooting. The reason why catadioptric imaging technology is adopted is that its cost is low, it is easy to manufacture, and this technology has been widely used in various fields, so it is relatively mature. The panoramic image obtained by the method mentioned in the text can include horizontal motion images in the whole space (Figure 5).

In the modern social environment, the assistance of landscape design through VR technology has become a mainstream design route. VR technology is widely used in medicine, entertainment, military aerospace, interior design, real estate development, industrial simulation, emergency deduction, games, geography, education, hydrogeology, maintenance, training, shipbuilding, automobile simulation, rail transit, energy fields, biomechanics, rehabilitation training, and digital earth. With the blessing of VR technology, the superimposed analysis of various elements can be realized. If GIS technology is added to the former, the scientificity and accuracy of VR technology-assisted operations can be improved, and the delay of landscape can be reduced. As a branch of digital technology, virtual reality technology is an advanced technology developed in recent years. It can use a computer platform to visualize a three-dimensional world, and provide participants with visual, auditory, logical, and other organ sensations. It enables participants to receive and experience information close to the truth in real time. In the field of digital landscapes, the paper uses modern technologies as painting tools. Digital technology in design can help designers better express their design ideas. When

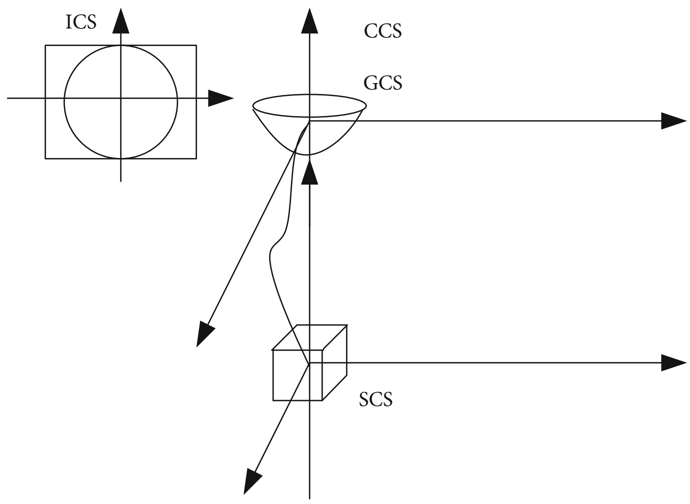

Figure 5: Relationship between ASODVS coordinate systems.

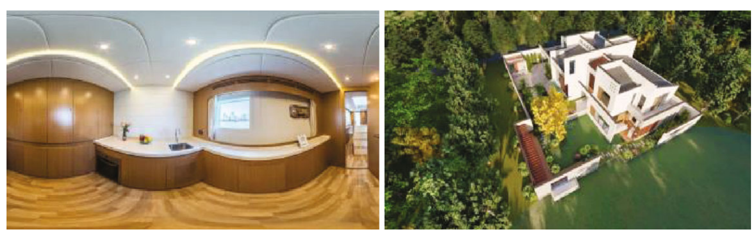

Figure 6: The interactive experience of VR in environmental art design.

performing related presentations, it is possible to express the interaction between the audience and the machine more strongly and develop this type of information dissemination ability, as shown in Figure 6.

The addition of VR technology enables the landscape to show different appearance changes in different climates and seasons, and the viewing effects are also very different. A major development prospect of VR technology is to show the seasonality and time of various landscapes. Different from traditional landscape design, in the landscape assisted by VR technology, different landscape characteristics can be displayed only by changing different seasonal data. The continuous development of VR technology on a global scale not only liberates traditional concepts and lifestyles but also poses new challenges to human development. Therefore, a certain tension must be maintained in the process of VR technology development. Regardless of the technology used to create the image of the environment, its main goal is to design indoor and outdoor spaces and serve humanity by designing them to meet social needs. At any stage of the development and practice of virtual reality design, it is important to take full advantage of the advanced capabilities of virtual reality technology and apply the technology to the process.

4. Experiment and Result Analysis

Together, the gyroscope and digital compass and accelerometer determine the final attitude of the head-mounted display. The three have their own advantages and disadvantages. The accelerometer is good at long-term measurement work and can provide stable and long-lasting performance guarantee. The gyroscope is the opposite of the accelerometer. It is more suitable for short-term angular velocity measurement, and the gyroscope has higher measurement accuracy and is no less stable than the accelerometer. However, compared with the two, the gyroscope is easily affected by the ambient temperature. If the ambient temperature fluctuates greatly, the gyroscope will drift during the working process, and the measured results will also have obvious errors. In order to obtain the real value of the included angle with the Geomagnetic South Pole, it can only be obtained indirectly. First, the magnetometer is used to measure the size of the geomagnetism, and then, the accurate value of the included angle is obtained through accurate conversion. Therefore, the pose of the head-mounted display goes through the process of the cooperation of the three, which is called fusion filtering.

In the calculation process of the composite complementary filter, the whole process is relatively simple and has low requirements on the microprocessor. Therefore, it does not produce a relatively obvious time delay and can quickly calculate the real-time results. However, the composite complementary filter still produces drift, mainly because its filtering effect needs to be improved, and the waveform has obvious fluctuation. In this paper, the test effect of UT Kalman filter needs to be compared with the signal measured in the complementary filter model. In this case, Figures 7 and 8 can be obtained.

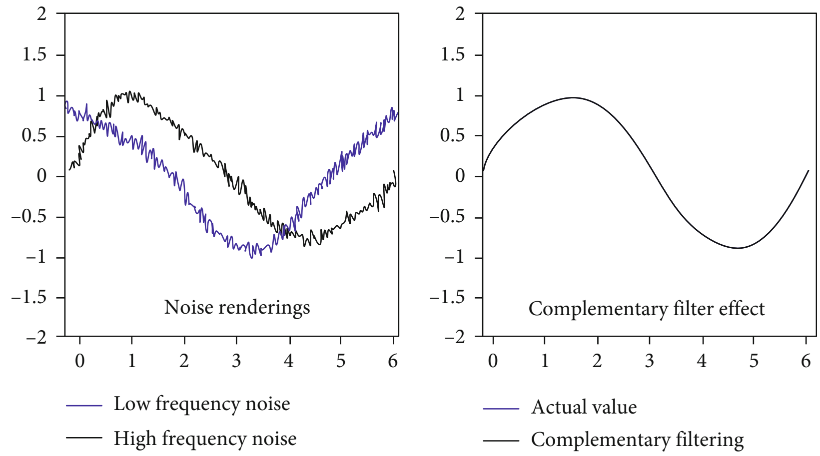

FIGURE 7: Complementary filtering effect.

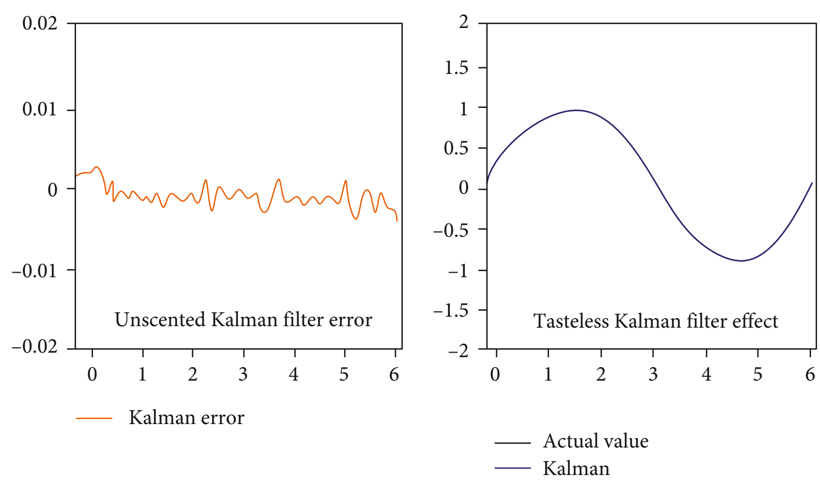

FIGURE 8: Tasteless Kalman filter effect and error.

Comparing the composite complementary fusion filter and the Kalman filter, the error between the two can be clearly seen, and the error of the former has a larger jitter range. Kalman filtering is an algorithm that uses the linear system state formula to optimally estimate the system state through the system input and output observation data. The detailed error averages for both are 0.5% and 0.12%, respectively. Therefore, in terms of ideal effect, Kalman filtering is better than composite complementary filtering.

Only when the motion model is a linear model, the Kalman filter can predict the state of the moving target. However, in general, the motion model is nonlinear, so it is inappropriate to use the Kalman filter to estimate the pose of the motion model. In this paper, the following methods are proposed to estimate the pose of moving objects: the Kalman filter method is extended and combined with sensors to estimate the pose of moving objects. In this system, the estimated target is established in the 3D space coordinate system, so the measurement data of the moving target has some nonlinear coefficients, and the voltage measurement can transform the problem into the relationship with the dependent variable. In multiple independent variables, that is, each spatial position is used as the dependent variable, and the voltage value collected by each sensor is used as the independent variable. It uses a linear relationship between the two and a multiple linear regression method to analyze the unique relationship between distal and voltage values. Through SPSS software to organize and analyze the measurement data, it carries out relevant simulation experiments on the attitude sensor with external electromagnetic interference. SPSS software is easy to use and easy to learn, and most functions are visualized. And in order to observe the data more intuitively during the experiment, a digital tube reading display can be implanted in the circuit, and the relevant drive system can be configured to output the data in real time. The relevant data are shown in Tables 1–3.

The most suitable path is the one without external interference. The observation path is the target path in the case of system noise and observation noise, and the actual path is the path of actual operation under external interference, so as to obtain a motion path that is closer to the reality. Commonly used devices for filtering include filters, reactors,

Table 1: Basic data of spatial location and voltage.

Model		Sum of squares	Df	Mean square
	Regression	301.22	6	50.203
X	Residual	23.64	34	0.695
	Total	321.73	39	
	Regression	27.15	6	4.525
Y	Residual	2.38	34	0.07
	Total	30.48	39	
	Regression	70.61	6	11.768
Z	Residual	13.96	34	0.411
	Total	84.02	39	

Table 2: Correlation coefficient analysis between spatial position and voltage.

Model	R	R^2	Adjusted R^2	Std. error of the estimate
X	0.966	0.931	0.92	0.81
Y	0.96	0.918	0.899	0.27
Z	0.915	0.834	0.806	0.65

Table 3: Multiple linear regression between spatial position and voltage.

Constant	t	Sig.	Tolerance	VIF
U1	-2.041	0.039	0.471	2.137
U2	-4.319	0	0.039	22.851
U3	1.322	0.23	0.062	16.023
U4	1.287	0.214	0.028	29.988
U5	-0.331	0.687	0.222	5.026

magnetic rings, and zero-phase reactors. The motion path in the real situation needs to be based on the path of its observation point. It should be noted that although the coupling current generated by electromagnetic interference varies with the frequency and the length of the transmission line, this change is not completely correlated. Coupling currents due to EMI will at the same time equalize the currents consumed by counteracting obstructions in the transmission line. Therefore, in a certain frequency range, the coupling current generated by electromagnetic interference will not increase significantly due to the increase of transmission lines. According to this phenomenon, if the influence of electromagnetic interference on the transmission line is to be minimized, the length of the transmission line should be increased as appropriate according to the actual situation. It can be seen from the table that the results inferred by the three methods are the same, which is enough to show that there is a relatively obvious linear correlation between the variables, and it can also prove that the obtained regression model is correct.

To simulate physical quantities such as direction, displacement, and speed of motion, the positioning accuracy of the target is the key, but the amount of information is quite large and there is instability. Therefore, the Kalman filter extended by nonlinear filter for state rating is undoubtedly a more effective way to deal with the rating of incompatible system conditions and parameters. The Kalman boost filter can combine n measurement data sensors to predict not only the current state of the system but also the future of the system. Regarding direction or target speed, it can also extract the actual signal or the measurement itself from the sensor data. Therefore, the positioning accuracy of the target and the predicted target trajectory during the manual reset process can be obtained through the extended Kalman filter. In this experiment, the state estimation simulation and error analysis of the trajectory are carried out in the MATLAB environment. The simulation results of the real trajectory and the filtered trajectory of the target position are shown in Figure 9.

The system calculation model established in this paper mainly relies on the relevant principles of multisensor information fusion technology and preprocesses the obtained information in advance. It uses the extended Kalman filter method to combine relevant information and also performs state estimation and state estimation of the edge of the telecentric orbit. From the simulation results, it can be concluded that the fusion data using the extended Kalman filter algorithm is close to the actual target motion data, and the accuracy rate is better than 92%.

5. Discussion

Multisensor information fusion technology is widely used not only in military, aerospace, and other fields but also in environmental art design. Combining the advantages of Kalman purifier with modern advanced technology, it promotes the scientific and digital direction of environmental design issues and promotes the scientific development of traditional medicine. This paper firstly establishes a mathematical model of VR positioning based on information fusion technology, so as to obtain a variety of relevant physical quantities during the movement of the model and perform state estimation and trajectory simulation. The EKF information synthesis algorithm can accurately estimate the point trajectory of the three-dimensional motion pattern, and the simulation experiment verifies the effectiveness of the algorithm. This provides a strong theoretical basis for further research in cyberspace and has certain application value. However, the experimental equipment has certain shortcomings in the accuracy of the experiment. In the later experiments, it is necessary to improve the model or apply algorithms to directly synthesize information to meet the test requirements. By building a 3D structural model in a virtual environment, users can more intuitively feel the information of each position in the environmental art space of the virtual environment. Accurate location simulations also allow people to immerse themselves in scenes without real objects, making it more intuitive to experience the

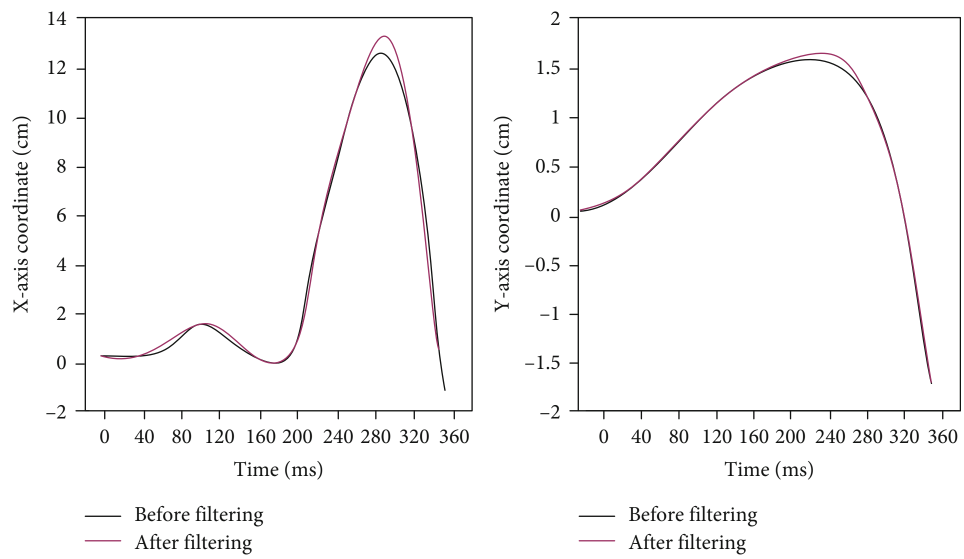

Figure 9: Real and estimated positions before and after filtering.

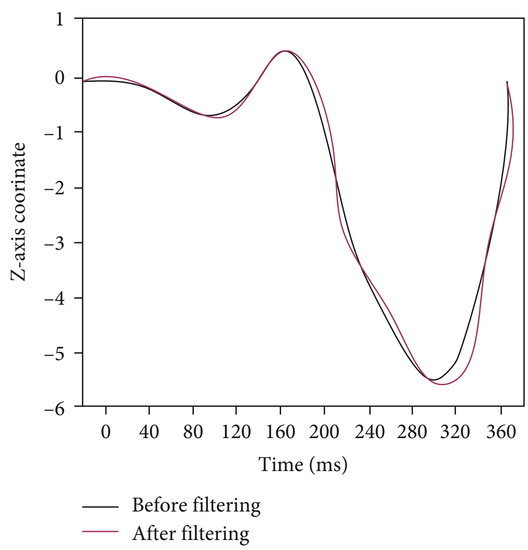

Figure 10: Real position and estimated position Z-X plane projection trajectory before and after filtering.

realism of landscape design and make real-time adjustments (Figure 10).

6. Conclusion

Attitude and displacement in inertial navigation are two distinct concepts. Most of its methods are used to determine the orientation of the vector, which is defined by the angle between the coordinate system and the absolute geographic coordinate system. If the carrier just changes its pose, its spatial position does not change. Displacement is the change in the position of the carrier in space. Therefore, pose and displacement are essential to explain the motion of the carrier regardless of the motion direction of the carrier. In the virtual panorama system, the method is used to set the rotation angle of the mobile phone screen and the panorama playback angle of the roaming control point. Displacement is used to detect changes in spatial position, which alter the panorama image of the panorama roaming control point.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare no conflicts of interest.

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