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Research Article

Application Research of Distributed UAV Nest Based on Multi-Information Fusion Sensor in the Field of Communication

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For the long delay in the communication field of the unmanned robot, which seriously affects the accurate evaluation of the operation status of the UAV, this paper introduces the multi-information fusion sensor into the field of distributed UAV nest communication. By using the multi-information fusion sensor to fuse the attitude data information of the UAV flight, the delay of the information obtained in the communication process is reduced. The multi-information fusion sensor needs to fully consider the delay problem in the communication field during the use of the UAV nest. By using the acceleration data information to make up for the shortcomings of the delay, relatively accurate and high-precision UAV motion evaluation results can be obtained. According to the simulation of the UAV using the multi-information fusion sensor during the flight, the method proposed in this paper is verified on the UAV system. After comparing the simulation and test results, it can be seen that the method used in this paper can effectively improve the application efficiency of multi-information fusion sensors in the communication field of distributed UAV nests, and has a high reference value for data information analysis.

1. Introduction

During the driving of the UAV, some sensor tools are used to collect data on the flight mode. Under normal circumstances, the altitude of the UAV is collected by the barometer, and the specific orientation of the UAV is locked by the GPS global positioning tool or the Beidou system. The IMU measures its data to determine the orientation of the UAV. The state in flight is effectively managed by the control system, and the flight state of the UAV is adjusted to achieve the preset flight target [1, 2]. If the flying height of the UAV does not need to be accurately measured, we only need to use the barometer to measure it. At the same time, the sensor has the characteristics of simple calculation and high work efficiency. However, the basic sensor has zero-sensing drift and temperature drift response. When accurately measuring the altitude of the UAV, it is necessary to use the resources of multiple sensors to provide the altitude and data of the UAV. When two multi-information sensors transmit information and parameters at the same time, the deviation of the temperature drift response of one barometer is just solved [3–5]. If the two barometers are skewed, the results are still skewed. For this deficiency, it is necessary to refer to the complex motor model in the dynamic model and estimation, and at the same time, because of the disadvantage that the data of the motor changes with the temperature change, a new situation has emerged. At present, the commonly used method in the world is to preprocess the drone before it flies. Just dealing with the effects of temperature drift for some sensors still will not address those sensors that change with temperature. As a common data acquisition tool in the field of communication, multi-information fusion sensor has been widely used in all walks of life. With signal as the medium of data information transmission, distributed UAV can provide accurate information sharing and analysis of its flight trajectory according to the characteristics of information fusion, and can also provide a reference basis for its data sharing in the field of communication. At present, in order to enable distributed UAVs to be used in the multi-information fusion process, it is usually necessary to comprehensively analyze and consider the characteristics of flight changes, flight purposes, and location changes according to the communication status of the distributed UAV nest. The multi-information fusion sensor needs to meet the above conditions during the flight of the UAV, and timely deal with the external noise interference generated by the communication process, which can realize large-scale use in different fields. Because the multi-information fusion sensor is simple in the data information process and requires less computation, the communication signal can maintain better high-order characteristics[1, 6–9]. Therefore, the multi-information fusion sensor can be effectively used in the field of UAV communication. On the basis of effectively acquiring the multi-information features obtained during the flight of the UAV, the bispectral quadratic eigenvalues of the distributed UAV communication signal can be obtained. Because of the information fusion accuracy that can be obtained by different computing methods, the signal feature values obtained by the distributed drone nest during flight can be obtained according to the multi-information features of the signal according to the high-precision computing method. Usually, the distance measurement method is used to analyze and study the flight characteristics of the distributed drone nest, which is highly practical. Due to the advantages of real-time, high-precision, and high-resolution during flight, UAVs can be used on a large scale in high-resolution processing, feature extraction, and signal classification, to reduce the characteristics of fusion information communication, thereby reducing the cost of sensor hardware [10, 11]. The pulse sequence of the communication signal can reduce the data processing time and effectively improve the ability of the distributed drone nest to resist external interference. The different factors that appear on it can be fused, but in the process of data information transmission, it is relatively complicated, which makes the collected data information relatively complicated. At present, according to the difference restoration method proposed by Chan et al. the partial differential gradient projection method is used to process data information, which can accelerate the convergence speed and enhance the stability in the process of information transmission, especially the communication signals using steep edges. The difference calculation is carried out according to the rule dynamic adaptive calculation method. The estimation of motion parameters of distributed drone nests can be transformed into a joint evaluation problem for recognition analysis of image reconstruction. The method mainly recognizes the motion signal parameters of the distributed UAV nests in the search area, performs effective synthesis of HR-RP with low signal-to-noise ratio, and realizes the accurate processing of the motion parameters of the distributed UAV nests.

Based on the detailed analysis of sensors used for multi-information fusion in UAV information recognition accuracy, the diagonal slice communication follows the extended Babbitt distance criterion to realize the extraction of multi-information fusion features of UAV nests. This method can quickly calculate the deviation and observation error value of the UAV, and can realize the complexity calculation of variation parameters. Experiments show that this method can quickly recover UAV flight data under low signal noise. The experimental results show that the method can effectively shorten the flight time of the distributed UAV, and can be accurately applied in the communication field under the condition of low signal-to-noise ratio. The robustness of the method is good, and when the signal-to-noise ratio is 0, the information fusion rate of the distributed drone nest can reach more than 95%. The zero drift and temperature drift response deviation of the sensor are minimized. In this paper, the calculation method in the optimization communication field is used to reduce the data in the communication field. Through the accelerated calculation of the fusion data, the zero-sensing drift and temperature drift of the UAV sensor can be supplemented.

2. Multi-Information Fusion Sensor

The multi-information fusion sensor mainly fuses the information channel data of the collected data information. However, the data fusion features calculated in this way are different from the results obtained by ordinary sensors [12]. The main reason is that the multi-information fusion sensor has a higher accuracy of the fusion information. Compared with ordinary sensors, this type of sensor can obtain data from drone nests more quickly. Assuming that the communication characteristics of the UAV fusion information obtained in the initial stage are significant, the fusion information operation function can be used to perform high-level accumulation of the acquired communication data, thereby effectively reducing the complexity of the data acquisition by the UAV nest during the communication process. Because the communication data of the UAV is collected in real time, the collection process of the data information cannot be interrupted, so that the loss of data in the communication process can be effectively avoided. Multi-information fusion sensors can be used to store data in multiple dimensions, so as to solve the problem of loss of a single sensor in the process of data collection. The method can effectively improve the accurate reading of the communication data of the distributed drone nest, and realize the optimization of data characteristics according to the characteristics of multi-information fusion data. In the communication process of the distributed drone nest, it is mainly based on abnormal changes caused by multiple factors such as the amplitude, characteristics, and information fusion degree of the data information, which can ensure that the UAV avoids the interference of information fusion noise caused by signal instability during the communication process. The instability of the signal transmission process is mainly divided into two types: irregularity and randomness. The irregularity is mainly caused by the mechanical jitter phenomenon caused by the incomplete collection of data information during the flight of the UAV. The randomness is mainly caused by the noise and modulation pulse jitter generated by the launch tube of the distributed UAV.

Therefore, in the communication process of the distributed drone nest, the signal modulation process is caused by the noise during the flight of the aircraft, and the flight noise is mainly generated by the modulation of different types of external disturbance information. They are different according to the collected signal characteristics. The non-

Gaussian and nonlinear characteristics corresponding to the noise generated by the communication transmitter of the UAV need to maintain the amplitude and information of the communication signal, and all the Gaussian noncolor noise can be effectively suppressed.

Using multi-information fusion sensors, sensor data information can be obtained from the system of distributed UAV nests. The linear system expression is used to realize the data acquisition and state evaluation of the flight state of the distributed UAV nest during the communication process. The data information obtained by the multi-information fusion sensor is greatly affected by noise and interference in the communication field [13]. Therefore, the use of the multi-information fusion sensor in the noise filtering process can effectively reduce the external interference. Because the variable that needs to be controlled in the distributed UAV nest test process in this paper is misprediction, the obtained data filtering also requires deep processing. In the field of communication, the multi-information fusion sensor mainly performs weighted average calculation on the test value of the algorithm and the corresponding measurement value of the sensor. The specific steps are as follows.

First, according to the optimal state of the above distributed UAV nest at any time, the state quantity of the future time is evaluated in combination with the system variables controlled by the current system at this moment:

$$x(k|k-1) = Ax(k-1|k-1) + Bu(k). \quad (1)$$

In the expression, $x(k|k-1)$ represents the flight result obtained using the flight state of the UAV, $x(k-1|k-1)$ represents the best result that the UAV can achieve in the previous state, and u(k) represents the control variable corresponding to the current flight state of the UAV. If the control quantity cannot be obtained, then $u(k)=0$, and A and B represent the state matrix of the system.

The real-time covariance expression of the multi-information fusion value can be obtained as

$$p(k|k-1) = Ap(k-1|k-1)A' + Q. \quad (2)$$

In the expression, $p(k|k-1)$ is used to represent the corresponding covariance value of $x(k|k-1)$, $p(k-1|k-1)$ is used to represent the corresponding covariance of $x(k-1|k-1)$ multi-information fusion, A' represents the transpose matrix of A, and Q represents the covariance obtained by the system during the multi-information fusion process.

According to the obtained predicted and measured values of the system, the best predicted value $x(k|k)$ of the current state of the system can be calculated as

$$x(k|k) = x(k|k-1) + Kg(k-1)(z(k) - Hx(k|k-1)). \quad (3)$$

$Kg(k-1)$ is used in the expression to represent the multi-information fusion sensor gain corresponding to the system at the previous moment, which is obtained according to the covariance obtained by the above sensors.

The expression that needs to be updated in real time for the multi-information fusion sensor gain is

$$Kg(k) = p(k|k-1)H' / (Hp(k|k-1)H' + R). \quad (4)$$

After completing the system update, $X(k|k)$ in k state can be expressed as

$$p(k|k) = (1 - Kg(k)H)p(k|k-1). \quad (5)$$

In the communication process, the communication system of the distributed UAV nest needs to evaluate the optimal communication status data that can be obtained by updating the multi-information fusion sensor gain in real time according to the above calculation process in each control cycle. However, because the data system can only use it in the field of communication, the systems in this field are linearly correlated. Although the multi-information fusion sensors can also be applied to nonlinear systems and used in the communication process of distributed UAV nests, the main purpose is to effectively eliminate the error values that appear in the system.

If in the process of extracting and merging information points, as shown in Figure 1, the multi-distributed UAV nest can be used to obtain the feature quantity that can be represented by $\widetilde{m}_1 = [u_1, v_1, 1]^T$ and $\widetilde{m}_2 = [u_2, v_2, 1]^T$, to represent the information characteristic coordinate values in the corresponding system. Then the relationship between $\widetilde{m}_1$ and $\widetilde{m}_2$ is expressed as

$$d_2\widetilde{m}_2 = R_{13}d_1\widetilde{m}_1 + t_{13}. \quad (6)$$

In the expression, d is used to represent the scale factor corresponding to the system, and $R_{13}Kukt_{13}$ represent the data information obtained between the internal rotation matrix and translation vector of the system [14]. Then in the field of communication, all the information feature points can be run in the expression to obtain the equation set of the system, and by using singular value decomposition, the optimal values of the obtained equations are R_{13} and t_{13} in turn, so, the phase obtained by the multi-information fusion sensor can be obtained, because the inherent relationship between the sensor's obtained UAV coordinate system and the body coordinate system is mainly a fixed value obtained after the communication system is determined, Therefore, it is also possible to calculate the relative displacement of the UAVs in the distributed UAV nest using the fusion data obtained from the sensors.

According to the above detailed analysis, the variables can be solved by using expressions, and the variables R_{13} and t_{13} need to be solved using three different eigenvalues. In the actual communication field, the robust performance of the system can be effectively improved. Using this method, the equations corresponding to all eigenvalues can be jointly solved. According to the obtained optimal solution, the computational complexity of the UAV in the communication process can be effectively reduced, especially the solution of the number of characteristic points corresponding to the communication system can effectively reduce the system delay time.

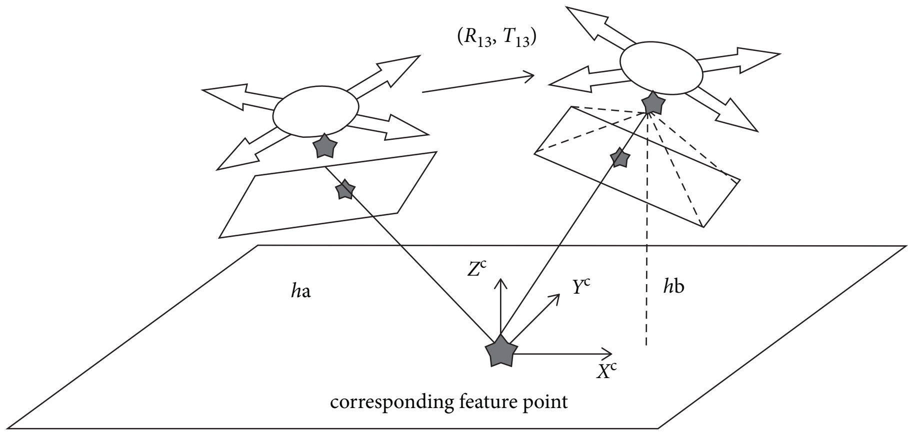

FIGURE 1: Schematic diagram of multi-information fusion sensor communication.

In order to effectively reduce the time delay of the UAV in the communication field, according to the multi-information fusion sensor used, the attitude estimation information of the distributed UAV nest during the flight process can be obtained. To solve the equation according to the known quantity R_{13}, the translation vector t_{13} used by the expression cannot be determined, which contains 3 unknown variables. Since the multi-information fusion sensor can be used according to the obtained UAV altitude direction and positioning data information, according to this mode, the obtained feature points can be used to effectively solve the individual unknowns, and the relative displacement t_{13} of the system is comprehensively calculated by using all the displacement test values, and the accurate results of the data fusion of distributed UAVs can be obtained. The use of this sensor can effectively shorten the multi-information fusion cycle and improve the communication quality of distributed UAVs. It should be noted that the distributed UAV can obtain accurate data information in the field of communication. In the actual use process, it is necessary to assist the obtained real position according to the data in the communication room. If the distributed UAV is flying at a lower altitude, then the optimal data can be obtained according to the multi-information fusion sensors used.

Application of Distributed UAV Nests in the Field of Communication.

In the application process of the distributed UAV nest in the field of communication, σ_w and σ_b are used to represent the corresponding relationship between the system coordinate system and the UAV body coordinate system in turn [14]. Then the dynamic characteristics of UAV nest flight can be expressed as

$$\begin{aligned} \dot{p}^w &= v^w, \\ \dot{v}^w &= a^w. \end{aligned} \tag{7}$$

In the expression, p^w, v^w, and a^w represent the three-dimensional coordinate value, three-dimensional velocity, and three-dimensional acceleration value corresponding to the UAV nest in the system coordinate system in turn. R_v^w is used to of represent the rotation matrix from the body coordinates of the UAV to the system coordinate system, then a^w can be expressed as

$$\begin{aligned} a^w &= R_b^w a^b, \\ a^b &= a^m - n_a - g, \end{aligned} \tag{8}$$

a^b and a^m in the expression represent the corresponding acceleration vector in the coordinate system of the UAV body and the three-dimensional acceleration vector onboard in turn. g represents the gravitational acceleration of the UAV. n_a indicates the acceleration measurement noise value.

According to expressions equations (7) and (8), after discretization processing, the real-time flight expression of the UAV nest can be obtained as

$$\begin{bmatrix} p^w \\ v^w \end{bmatrix}_{k+1} = \begin{bmatrix} 1 \, \Delta t \\ 0 \;\; 1 \end{bmatrix} \begin{bmatrix} p^w \\ v^w \end{bmatrix} + \begin{bmatrix} 0 \\ (R_b^w a_k^m - g)\Delta t \end{bmatrix} + \begin{bmatrix} 0 \\ -R_b^w n_a \Delta t \end{bmatrix}. \tag{9}$$

In the expression, Δt is used to represent the update period of the multi-information fusion sensor.

The UAV nest mainly uses it to transmit and process communication data in the communication process. The model can also be constructed according to the data collected by the multi-information fusion sensor, because it can be expressed as

$$\begin{aligned} X_{k+1} &= A_k X_k + B_k u_k + \phi_k, \\ Z_k &= H_k X_k + \varphi_k. \end{aligned} \tag{10}$$

X in the expression represents the state vector of the communication system, u represents the input vector of the communication system, and Z represents the observation vector of the system. ϕ and ϕ represent the data processing process and noise of the system in turn. Usually, the mutually uncorrelated system constructed is Gaussian white noise, and its corresponding variance is Q and R in turn. The multi-information fusion sensor used can use recursive filter as the minimum variance. In the field of communication, the distributed UAV nest is mainly to update the data and time state, then use $\widehat{X}_k^+$ and $\widehat{X}_k^-$ to represent the distributed unmanned aerial vehicle in turn. Then, $\widehat{P}_k^+$ and $\widehat{P}_k^-$ are used to represent the system prior estimates that can be obtained by distributed UAVs at time k, and {O3t0} and {O3u6} are used to represent the corresponding estimation variance in the communication system. Then the data update process of the UAV is as follows.

Step 1: Time update of communication information acquisition: According to the posterior estimation data information in the previous time period, the real-time prior estimation of the distributed UAV can be quickly calculated and expressed as

$$\begin{aligned}\widehat{X}_k^- &= A_{k-1}\widehat{X}_{k-1}^+ + B_{k-1}u_{k-1},\\ \widehat{P}_k^- &= A_{k-1}\widehat{P}_{k-1}^+ A_{k-1}^T + Q.\end{aligned} \tag{11}$$

Step 2: The system status of the UAV flight is updated, combined with the prior estimated value and measured value of the current system, can effectively evaluate the posterior value of the current moment.

$$\begin{aligned}K_k &= \widehat{P}_k^- H_k^T\left(H_k\widehat{P}_k^- H_k^T + R\right)^{-1},\\ \widehat{X}_k^+ &= \widehat{X}_k^- + K_k\left(Z_k - H_k\widehat{X}_k^-\right),\\ \widehat{P}_k^+ &= \left(I - K_kH_k\right)\widehat{P}_k^-.\end{aligned} \tag{12}$$

In the expression, K_k is used to denote the multi-information fusion sensor filter gain.

For the motion estimation process of UAVs in this communication field, the state vector is mainly a variable composed of the position and speed of distributed UAVs. The process equation is mainly provided by expression equation (12), and the observation vector Z_k is mainly a multi-information fusion sensor model in the communication field, such as formula (13) expressed as

$$\begin{cases}\begin{bmatrix}p^w\\ v^w\end{bmatrix}_{k+1} = \begin{bmatrix}1\,\Delta t\\ 0\;1\end{bmatrix}\begin{bmatrix}p^w\\ v^w\end{bmatrix} + \begin{bmatrix}0\\ \left(R_b^w a_k^m - g\right)\Delta t\end{bmatrix} + \begin{bmatrix}0\\ -R_b^w n_a\Delta t\end{bmatrix},\\ Z_k = \begin{bmatrix}1 & 0\end{bmatrix}\begin{bmatrix}p^w\\ v^w\end{bmatrix}_k + \varphi_k.\end{cases} \tag{13}$$

By comparing expression equation (12) and expression equation (13), it can be calculated as

$$\begin{aligned}A_k &= \begin{bmatrix}1 & \Delta t\\ 0 & 1\end{bmatrix},\\ B_k &= I_{2\times 2},\\ H_k &= \begin{bmatrix}1 & 0\end{bmatrix}.\end{aligned} \tag{14}$$

According to the above analysis, the delay of Z_k obtained by the sensor in the communication process of the distributed UAV in the actual application process can be calculated according to the expression equation (14). The processing time of the multi-information fusion sensor will cause the delay in the distributed UAV in the communication process. However, in the UAV communication system, there will be many problems such as data delay and hardware serial port delay in the process of collecting data transmission. The delay in these two links will constitute the total delay of the observation vector in the system, and it is necessary to collect data on the delay of the distributed UAV during flight. If the data can be collected according to the formal process, it will have a certain impact on the accuracy of the system. In the communication system, the input vector and communication frequency of the system can be obtained by using the multi-information fusion sensor. The sensors mentioned in this paper can use the UAV attitude obtained by the communication system, and the estimated corresponding frequency is set to 100 Hz, which will effectively reduce the delay of the system. The time delays and different update frequencies corresponding to different measurement values of distributed UAVs in the communication system are shown in Figure 2.

Because the input variables of the system are updated faster in data fusion, they can be discretized in time. If the data information obtained by the UAV in the communication field will make the system time of the observation vector correspond to the update period of the D input vectors. Then the motion measurement process of the time delay compensation of the UAV will be shown in Figure 3. Among them, D represents the state estimation of the communication system before this moment, as shown in Figure 3.

In order to obtain the cumulative term of the input vector of the system, it is necessary to save the real-time data fusion vector $[u_{k-D}, u_{k-D+1}, \ldots, u_{k-1}]$ of the UAV to complete the accumulation. During the actual communication process, in order to reduce the computational complexity of the system computation time, a recursive method is used to calculate the system. According to the input vector accumulation term of the system, $U(k)$ is used to express it as

$$U(k+1) = U(k) + u_k - \begin{bmatrix}1 & (D-1)\Delta t\\ 0 & 1\end{bmatrix}u_{k-D}. \tag{15}$$

According to the time delay compensation flight movement of the UAV in the communication process, the current state test value can be effectively calculated. It is necessary to fully consider the system input vector and observation vector available in the current real-time system, and meanwhile, it can be effectively used in multi-information fusion sensors to update the minimum variance estimation value of the system. Because of the existence of a time delay in the acquisition of the observation vector by the sensor, an update is required to compensate for this time delay.

3. Analysis of Experiment and Results

For the real-time motion calculation evaluation method published in this paper, the corresponding experimental research is carried out. Figure 4 is the configuration diagram of the UAV. Its main sensors include a downward-facing monocular camera, a height gauge, and a multi-information fusion sensor, which is composed of an accelerometer, an electronic compass, and angular velocity. The UAV nest contains a wireless communication device to communicate with the host on the ground. The ground host is mainly for the calculation in the field of communication, and the

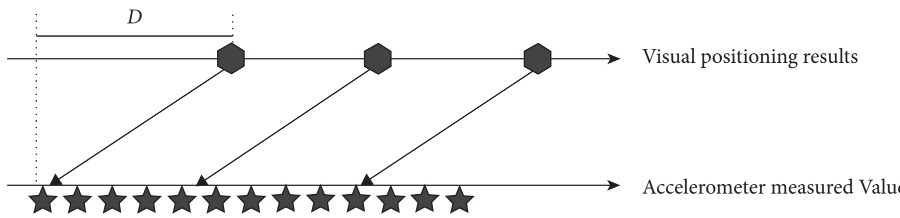

Figure 2: UAV measurements with different delays and update frequencies.

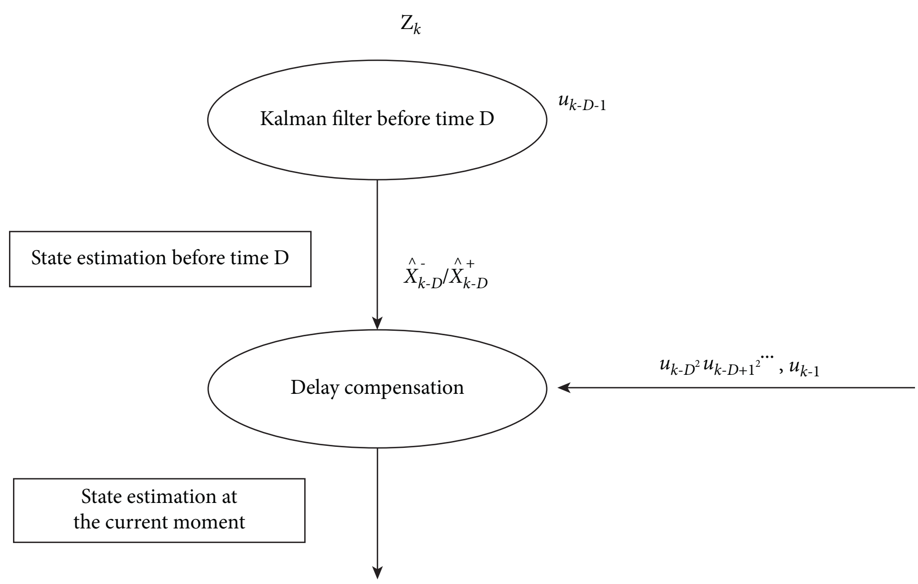

Figure 3: UAV flight motion evaluation with delay compensation.

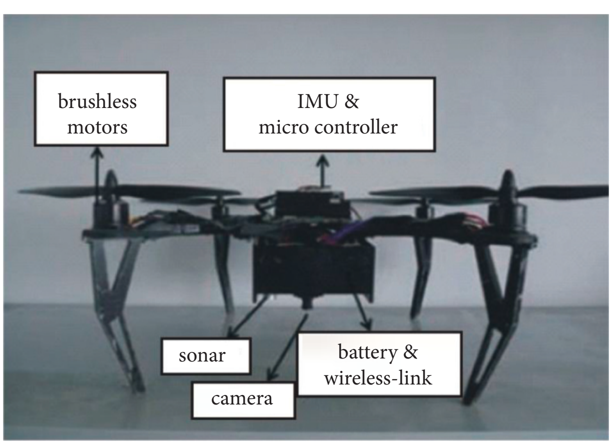

Figure 4: UAV nest system configuration.

microprocessor of the UAV is used for attitude calculation, data collection, and operation of the UAV nest.

When the UAV is driving, the photos collected by the camera on the UAV and the information transmitted by the multi-information fusion sensor are both fed back to the ground host. The ground host uses SURF (speeded up robust feature) to process and match the information, and then uses the attitude information to fuse to obtain the final data. The time delay results are fed back to the onboard processor, and the data combined with the acceleration measurements are used for estimation (Figure 5).

To be able to analyze better, a ground positioning system is established to obtain data information for reference. As shown in Figure 6, the high resolution of the camera and the flying height of the UAV can provide accurate positioning and tracking at all times. Compared with the previous airborne communication system, the ground positioning system can use a more functional camera, and the vibration of the UAV nest does not affect the data of the camera, so the positioning becomes particularly convenient and simple. To make the positioning data of the system more accurate, an artificial mark is placed on the UAV nest, as shown in Figure 7. The UAV nest is measured by using a sonar sensor with an accuracy of 1 mm and a range of 5 mm. Even if there is no more accurate measurement software to verify the data, we use the artificial mark to be placed at a certain position statically for verification. The verification result data is within one centimeter, which can be better used as a parameter. The measurement tracking of this system is relatively simple, but the reference data can also be processed offline, and the accuracy of this system can be guaranteed. From the above data, it can be seen that this system can provide high-precision motion data, and can be used as reference data to evaluate the results of airborne motion.

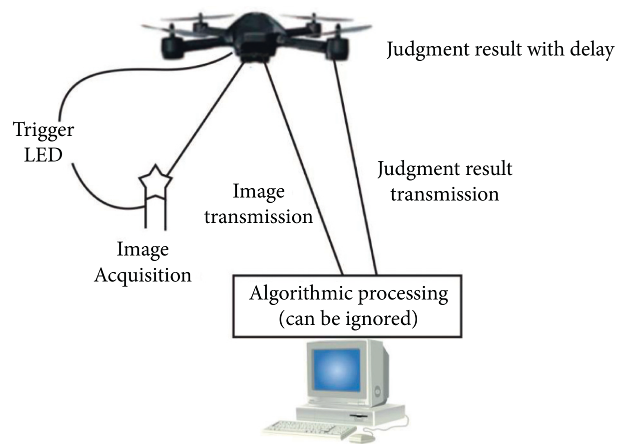

FIGURE 5: Measurement of other delays in the system.

FIGURE 6: Reference positioning system.

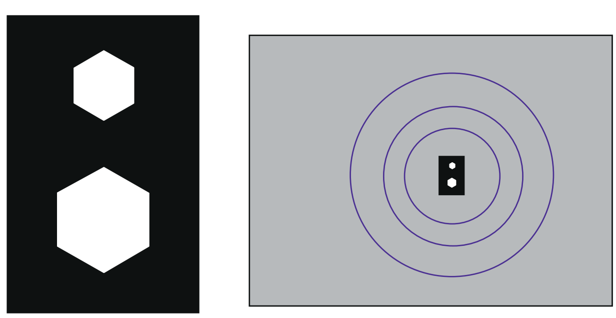

FIGURE 7: UAV nest positioning with the help of artificial markers in the reference system.

The experimental structure diagram is shown in Figure 8. The update frequency of the results in the communication field of the UAV nest system is 150 ms, the delay of the results in the communication field is 180 ms, and the update frequency of the multi-information fusion sensor (including the accelerometer) is 100 Hz. According to the motion estimation based on the multi-frequency and multi-information fusion sensor, the update frequency of the obtained motion estimation result is consistent with that of the fastest sensor, which is also 100 Hz. Therefore, in the follow-up experimental data, except the update period of the initial communication field results (the results without fusion with the accelerometer) is 150 ms, the update frequency of other motion estimation results is 100 Hz. In addition, the frequency of the reference data provided by the ground reference system is 30 Hz, but in order to facilitate the comparison with the 100 Hz motion estimation result, the reference data is smoothed and can be regarded as continuous (that is, the 100 Hz motion estimation results have corresponding reference data for comparison at any time).

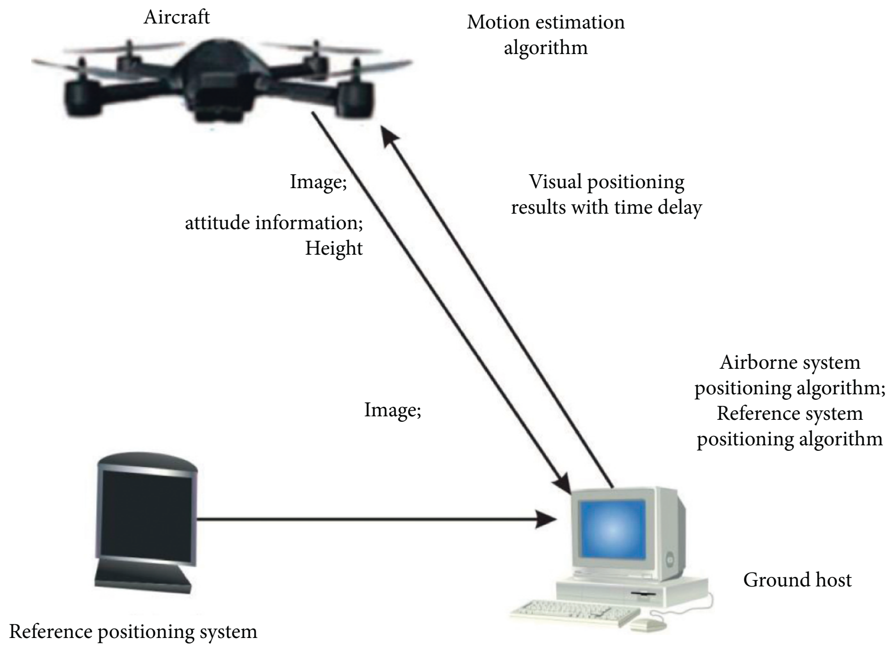

Figure 8: Experimental framework.

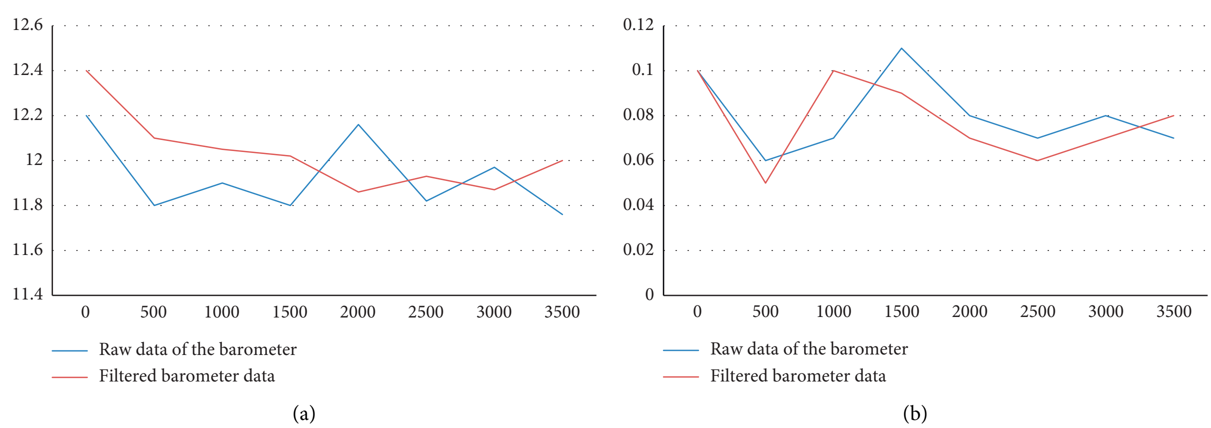

Figure 9: Raw data and filtered data of the sensor. (a) Barometer data. (b) Accelerometer data.

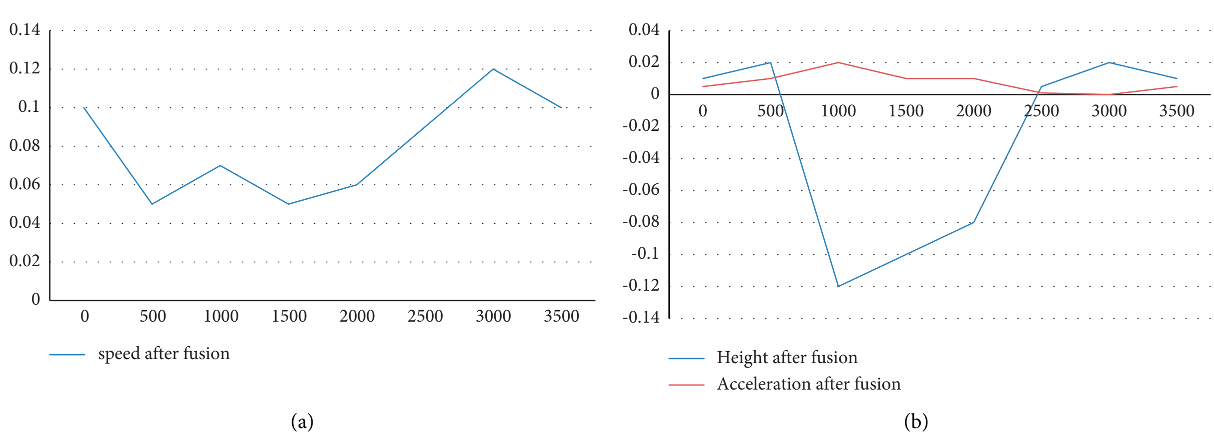

Figure 10: The data after fusion. (a) Velocity after fusion. (b) Final acceleration and position.

Due to the consideration of volume and economic cost, the accelerometer and barometer carried by the UAV have large zero offset and temperature drift effect. Figure 9 shows the original data of the sensor when the UAV is stationary and the data after multi-information fusion sensor denoising.

Obviously, the multi-information fusion sensor has a good denoising effect. Figure 10(a) is the velocity after fusion of the measured velocity obtained by the barometer difference and the accelerometer, and Figure 10(b) is the acceleration and position information obtained according to the velocity.

It can be seen from the simulation results that the method of combining the multi-information fusion sensor and the third-order complementary filter to calculate the position information of the UAV proposed in this paper can effectively eliminate the measurement error caused by the zero-bias error of the sensor and the temperature drift effect. The real-time status of the UAV during flight can be obtained.

4. Conclusion

In order to effectively solve the problem that the UAV cannot perform the task accurately due to the constraints of information fusion in the process of executing the target task, this paper proposes to apply the multi-information fusion sensor to the UAV communication process. The method mainly uses the distributed network structure in the communication process of the UAV, adopts multi-information fusion sensors to collect the data information of the UAV flight process in real time, and transmits it to the distributed UAV nest communication system to realize the process. The aircraft nest data analysis system will accurately evaluate its state according to the fusion data, and then can solve the problem of information delay in the flight process of the distributed drone nest. The process multi-information fusion sensor used can perform effective delay compensation on the communication data. Finally, through the analysis of the experimental results, it can be seen that the method proposed in this paper can effectively solve the problem of information delay in the flight process of the distributed drone nest. In the future communication field, the method can be used in the data fusion process of distributed drone nest communication to control the flight status of the drone nest.

Data Availability

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

Conflicts of Interest

The author declares that there are no conflicts of interest.

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