The DATABASE DESIGN OF UNMANNED AERIAL VEHICLE

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Abstract

There are many kinds of UAV because of the diversification of the application scenarios, and each of which contains a variety of models, each model also contains a number of UAV external features and flight parameters. Present UAV data management lacks efficient and cost management tool, is now widely used in traditional file management. Using this approach to UAV flight data parameters and characteristics of the management, not only need to find after the data literature, literature in the original data processing and analysis. In this process, the possibility of human error. But also in the latter part of the maintenance process prone data redundancy information, scheduling information is lost or confused. With the passage of time, this management approach influenced by the environment, nature almost impossible to avoid breakage, high administrative costs and other issues.

In the face of these defects, this paper firstly studies the related technology of database, and analyzes the design method and design idea of the database system. Aiming at the problem of UAV related parameters management, the background database is established by Oracle, and the data of UAV is recorded and analyzed.

The use of Basic Visual 6 production procedures. To call the data after the end of the data processing in the background. And through this platform to maintain the database directly. Based on the ODBC data connection specification, the front desk software and the backstage database establishes the connection, realizes the database login, the inquiry, the renewal, the maintenance and so on. In this paper, the design and development of the UAV database management system, and detailed exposition of the various functions of the design, implementation process, gives the results of the development and user experience.

The realization of the of UAV flight data and the feature parameters of the summary. Change the machine data summarized manner, and greatly reduce the workload of the database management. At the same time, human caused the possibility of erroneous data. While improving the efficiency of data processing and analysis. A significant reduction in the impact of the natural environment on the database, with a high practical value.

Keywords：UAV; database; data management; Oracle; ODBC

1. Introduction

Unmanned aerial vehicle (UAV) is a kind of UAV which has power, can be controlled, can carry a variety of mission equipment, perform a variety of tasks, and can be reused, referred to as UAV [1]. With the

continuous development of UAV technology in our country, as well as the gradual deepening of the understanding and research of UAV, the advantages of UAV have been gradually mined, and UAV has been used in more and more scenes. Its use function has gradually changed from the information collector at the beginning to the information processing feedback, which is an important means of information confrontation, information superiority and firepower attack in the future [2]. All kinds of UAVs are becoming more and more abundant, and UAV models are just like blowout. Western developed countries mainly in the United States attach great importance to the sustainable development of UAV system, and are constantly updating their UAV development roadmap to meet the changing application requirements of UAV and other UAV Systems [3].

Database, simply speaking, is an electronic management system that can be regarded as a file cabinet. Users can add, update and delete the data in the database after obtaining the administrator's permission. The birth and development of database has brought a great revolution to computer information management. Over the past 30 years, thousands of databases have been developed and constructed at home and abroad, which has become the infrastructure of daily work, production and life for enterprises, departments and even individuals [4]. After referring to the relevant data and literature, the advantages of collecting UAV data and making it into a database are summarized as follows:

① Realize data sharing and reduce data redundancy

② Enhance the independence of data and realize the centralized control of data

③ Improve the maintainability of data, while ensuring the security and reliability of data.

Through the design and development of UAV database, this paper analyzes the limitations of the current UAV database, optimizes the management method of UAV data and makes software, improves the existing problems at this stage, and reserves the interface and conditions for adding and upgrading the database.

1.2 Research status at home and abroad

1.2.1 Research status of UAV at home and abroad

UAV has traditionally been used for intelligence collection, reconnaissance and surveillance, and target acquisition, but in recent years, the U.S. Department of defense has expanded its combat mission to the field of armed reconnaissance. In view of the UAV's ability to perform a variety of tasks and its outstanding performance in recent local wars, its operational application has been continuously expanded [5].

UAVs first appeared in the 1920s, when they were used as training targets. It's a term used by many countries to describe drones. Literally, this term can describe cruise missiles developed from kites, radio controlled aircraft, and even V-1 missiles, but in military terms it is limited to reusable heavier than air vehicles [6].

Although the development of UAV system was slow in most of the 20th century, some military projects after 1950 focused on solving the basic problems of automatic stabilization technology, remote control technology and automatic navigation technology [7]. During the desert storm operation in 1991, the U.S. military launched a small UAV specially designed to deceive the radar system as a decoy, which also became the target of other countries. At the same time, the U.S. military UAV tactics also have new ideas, such as "compound eye" and "bee colony" tactics. This paper analyzes its command and

technical system, and studies the information system integration method when the U.S. military develops new weapons [8].

In March 1996, NASA developed two test aircraft: x-36 test tailless UCAV. The aircraft is 5.7 meters long and weighs 88 kg, which is 28% of the size of an ordinary fighter. The split aileron and steering thrust system is more flexible than conventional fighter. The horizontal and vertical tail not only reduces the weight and tension, but also reduces the radar cross section. The ideal tasks of the UAV are suppressing the enemy's air defense, intercepting, battle loss assessment, theater missile defense and ultra-high altitude attack, especially suitable for the mission in politically sensitive areas.

Before the late 20th century, they were just smaller than full-scale remote-controlled airplanes. The U.S. military's interest in such vehicles is growing because they provide low-cost, mission resilient combat machines that can be used without the risk of crew death.

After the 1990s, Chinese scientists put forward the development demand of UAV Control Technology Based on flight safety. The control technology combining autonomous control and artificial decision-making is adopted to improve the autonomous control ability of UAV flight control process and reduce the degree of human intervention, so as to effectively improve the safety of UAV system [9].

In the 21st century, China's UAV is booming. Now, UAV has become a very hot topic. Its application has gone beyond the military category and penetrated into all aspects of human life, such as economy, technology and culture. It plays many roles, such as "shepherd", "fast worker", "field guide", "filmmaker" and "archaeologist" [10].

1.2.2 Database research at home and abroad

After using computer, with the growth of data processing, data management technology is produced. The development of data management technology is closely related to computer hardware (mainly external memory), system software and the scope of computer application. The development of data management technology has experienced the following four stages: manual management stage, file system stage, database stage and advanced database technology stage [11] [12].

At present, the most popular research directions in the field of database research include information integration, data flow management, sensor database technology, XML data management, grid data management, DBMS adaptation, mobile data management and micro database, database user interface, etc. [13].

The history of database can be traced back to 50 years ago, when data management was very simple. Through a large number of classification, comparison and table drawing machines, millions of punch cards are run to process data, and the running results are printed on paper or made into new punch cards. Data management is the physical storage and processing of all these punched cards [12].

The main achievements in database field in 1960s are IDS system and DBTG report. Among them, Charles W. Bachman, the first Turing prize winner in the field of IDS petroleum database, developed it [14]. In the late 1960s, a new type of database software, decision support system (DSS), appeared. The purpose of DSS is to enable managers to make more effective use of data information in the decision-making process.

In 1970, express, the first OLAP tool, was born. Other decision support systems followed, many of which were developed by the company's IT department. In 1985, the first business intelligence system was developed by metaphor Computer Systems Co., Ltd. for Procter & Gamble Company. It is mainly

used to connect sales information and retail scanner data. In 1988, IBM researchers Barry Devlin and Paul Murphy invented a new term information warehouse. After that, it manufacturers began to build experimental data warehouse. In 1991, W.H. "bill" inmon published a book "how to build a data warehouse", which made the data warehouse really start to be applied [16].

In the 1990s, with the wide adoption of PC based client / server computing mode and enterprise software package, the transformation of data management was basically completed. Data management is no longer just the storage and management of data, but a variety of data management methods that users need. The emergence of Internet and XML language has opened up a new field for the development of database system. In the past 30 years, the database field has won three computer Turing awards, which fully shows that the database is a place full of vitality and innovative spirit [17].

At the same time, there is still a big gap between China's information and electronic data management and foreign advanced data management methods. The introduction of databases in China began in the 1970s. In 1975, Beijing Literature Service Office introduced the gra database of the United States; in 1978, the Institute of mechanical information introduced two kinds of British tape databases; in 1986, the State Oceanic Administration introduced two kinds of CD-ROM databases for the first time; in 1987, Beijing Library introduced the Eric database of the United States [18].

As of February 2010, the total number of online databases in China was 169867. Among the 1038 databases included in China Database encyclopedia, 58.9% of the databases are published on CD-ROM, and 85% of the databases can provide retrieval services through the Internet (or CD-ROM) [19]. China's academic journals, China's science and technology literature and other CD-ROM publishing leading position. Online government information, industry and enterprise information, science and technology education information, culture and entertainment information, news information, tourism information and regional characteristic information have all formed a certain scale.

The units with more databases are Wanfang Data (Group) Co., Ltd., China information bank, Xinhua News Information Center, economic daily and National Library of China. China has established and developed various types of literature information databases, such as index (catalog) database, abstract database, full-text database, etc. [20].

With the continuous expansion of information management content, with the emergence of a variety of data models (hierarchical model, mesh model, relational model, object-oriented model, semi-structured model, etc.), new technologies emerge in an endless stream (data flow, web data management, data mining, etc.) [21]. After the rapid development of relational database in the 1980s, database technology is facing new challenges and development opportunities [22]. Every few years, some international senior database experts will gather together to discuss the current situation of database research, the existing problems and the focus of new technologies that need to be paid attention to in the future. The database is also developing in the direction of more comprehensive, large-scale and network.

2. Design of UAV database

2.1 Overall scheme design

The whole UAV database system adopts the combination of VB (Visual Basic) and Oracle (Oracle database). Oracle database, also known as Oracle RDBMS, or Oracle for short. Oracle is a relational database management system. It is a leading product in the field of database. It can be said that Oracle

database system is a popular relational database management system in the world. The system has good portability, convenient use and strong function. It is suitable for all kinds of large, medium, small and microcomputer environments. It is a high efficiency and reliable database solution for high throughput.

VB programming software. Visual basic, referred to as VB. It is a structured, modular, object-oriented, event driven visual programming language developed by Microsoft. This is a language that can be used for Microsoft's own product development. It comes from basic programming language. VB has a graphical user interface and rapid application development system, can easily use Dao, RDO, ADO to connect to the database, or easily create active X control. Programmers can easily use VB components to quickly build an application.Form design, using card layout, that is, click the pop-up window mode. The advantage of this selection is that each function runs independently, and cross errors are not easy to occur. At the same time, a single form occupies less resources, and the startup speed is faster. For users with only a single query target, the efficiency can be greatly improved.

On the premise of high efficiency and accuracy of data query, the compatibility problem is considered to the maximum extent, so that the software can run on Windows 2000, Windows XP, Windows 7, windows 8.1, windows 10 and other systems.Considering the compatibility of resolution, the UAV database system can adapt to 1366 * 768, 1440 * 900, 1920 * 1080 and other resolutions.Security issues choose to set up two types of accounts: ordinary users and administrators, and they can register their own account password through restrictions.

The realization of the most important query function in the database system is divided into three parts: keyword query, browse query and tree view click query.Keyword query is to input keywords in the text box, click query, you can directly get similar results with the input keywords. The advantage of this method is simple and efficient, you can directly query the information you need. At the same time, fuzzy query can be carried out, such as: Global Hawk only needs to enter the keyword "Hawk" or "global" to check the relevant results of the data.Browsing query is to gradually narrow the selection range and finally determine the relevant or similar query results through condition selection. The advantage of this method is that it is convenient for comparison and has better reference significance.

Tree view click query refers to the establishment of tree view in all levels of the software interface. After narrowing the scope, click query directly to pop up the relevant results. The advantage of this method is that the user can find the required model by his impression when he does not know the model name, or guide the user to find the required model when the query purpose is not clear.

The problem of data maintenance in database system is divided into data maintenance and file maintenance, both of which are completed by the administrator. Ordinary users are not allowed to operate, they can only browse and query the data, pictures and videos in the database.

2.2 Overall framework and relationship design

In general, the tree relationship is adopted, and each node represents a selection button. After opening the software, select the login mode, which is divided into ordinary users and administrator users.

After entering the interface, ordinary users can directly select the query mode to start querying UAV data, and design and make a fuzzy query function in the keyword query. If the keyword cannot be found, you can choose two alternatives: browse query and tree view click query.

If you log in as an administrator, there will be more options for data maintenance, in which you can add, change, delete and other operations on the database data, and update and replace the relevant pictures and videos of UAV models. To sum up, the framework relationship of UAV database system is drawn, as shown in Figure 2.1：
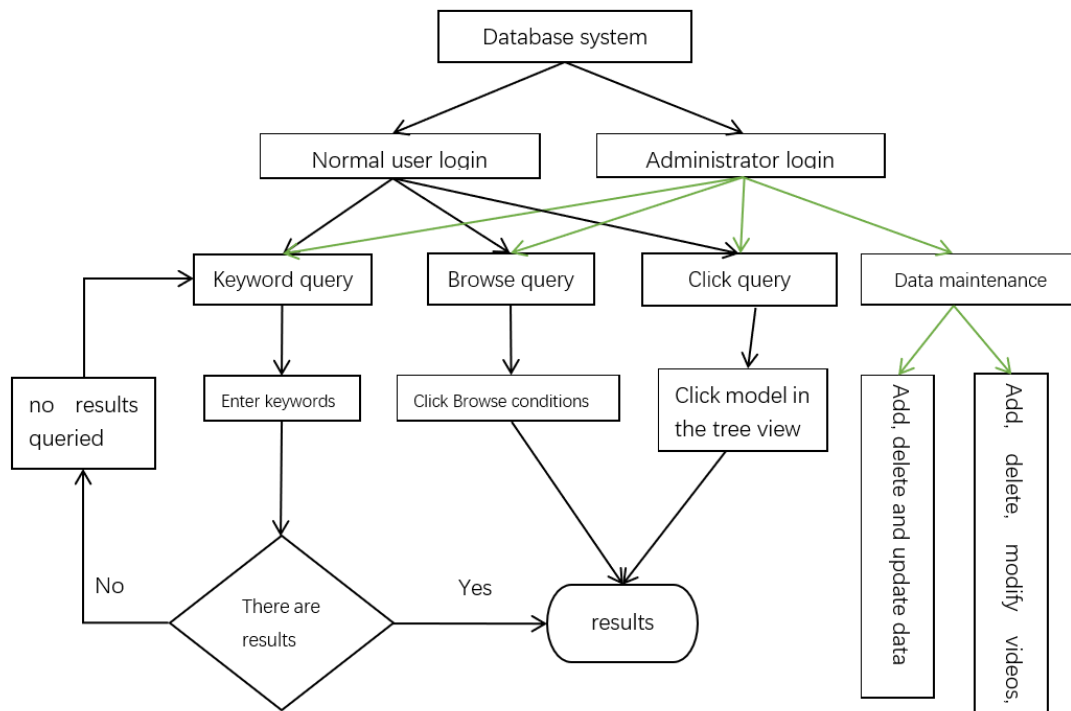

Figure 2.1 Overall framework

3. Front desk software design

3.1 Login function and interface design

The design of login part is divided into three parts: start interface, user login interface and user registration interface. Open the software, the first part is the database start interface. At the top of the start interface, the label control in VB is used to make the UAV database title. At the bottom, two command button controls are used to guide users to select "administrator login" and "ordinary user login" respectively. The command button button uses 3D style, protrudes from the display interface, and has a slightly concave animation when clicking, so that users can find it intuitively and clearly, and it is easy to use, as shown in Figure 3.1. After selecting the login mode, enter the second part, user login. This part is divided into two interfaces, the administrator login interface and the ordinary user login interface. They use different tables to manage the login verification separately. After login, the query interface is also slightly different. In the upper part of the interface, label control is used to write the titles of "administrator login" and "ordinary user login" in the two login interfaces.

Figure 3.1 Login interface (left) registration interface (right)

Click the register button in the login interface to enter the third part, user registration interface. This part is also divided into two interfaces: "administrator registration" and "ordinary user registration". The title is written with label control at the top, and the "registration code", "user name" and "password" are marked with three labels at the bottom. The "registration code" is unique to the administrator registration interface, which is a protective measure to prevent ordinary users from registering administrators and logging in through administrators After obtaining the administrator's permission, the data in the database will pose a threat.

3.2 Navigation function and interface design

The navigation part is the first interface that users see after logging in to the database system. The layout and design of this interface directly affect the user's first feeling when using the software. On the left is the tree view. Click the query part, and use treeview control to make a simple tree view. The tree view Title is UAV query, which is divided into unmanned detection type, observation and fighting type, and unmanned target type The model and all UAVs have four parent nodes, and the sub nodes of this type of UAV are summarized under each parent node. Double click and click directly to pop up the detailed characteristic parameters, relevant pictures and videos of this type of UAV.

There is a TextBox control in the back, which is used to input the name of the UAV that users want to know, and supports fuzzy query, that is, input any one or more words in the model, and the relevant parameters, pictures and videos of the UAV will pop up. Under the TextBox control, there are five commands: "query", "browse by country", "browse by service time", "switch user" and "exit system" The buttons made by the button control correspond to different functions and query methods. The setting of the switch user button is to meet the needs of users who want to log in again or log in with different permissions. You can directly return to the login interface and select the login method again without quitting the system to reload, as shown in Figure 3.2.

Figure 3.2 Navigation interface

It should be noted that when you log in to the system with administrator rights, there will be a data maintenance button next to the query button. This is to meet the needs of the system for data maintenance function.

3.3 Query function and interface design

3.3.1 Query function design

The query function is divided into keyword query, browse query and tree view click query.

Keyword query is to input keywords in the text box and click query to get the results directly. The advantage of this method is that it is simple and efficient, and can directly query the required information. At the same time, fuzzy query can be carried out. For example, Global Hawk only needs to enter the keyword "Hawk" or "global" to find the relevant results. At the same time, the pictures of the UAV can be displayed in the interface. At the same time, if you want to view the video of the UAV, click the relevant video button to pop up the relevant video.

Browsing query is to gradually narrow the selection range and finally determine the relevant or similar query results through condition selection. The advantage of this method is that it is convenient for comparison and has better reference significance. In the navigation interface, the browsing query method is divided into two parts: query by country and query by time. The design of the query interface by country is shown in Figure 3.3.
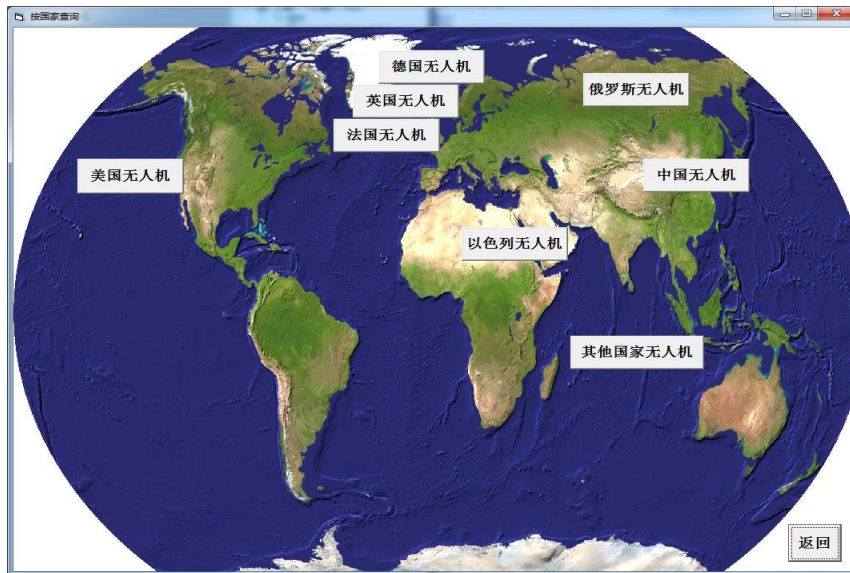

Figure 3.3 Browse interface by country

Tree view click query refers to the establishment of tree view in all levels of the software interface. After narrowing the scope, click query directly to pop up the relevant results. In this part, the tree diagram also divides all UAVs into four parts: unmanned reconnaissance type, integrated detection and combat type, unmanned target type and all UAVs, so that users can obtain more information and know their required models and relevant parameters more clearly when querying. The advantage of tree view click query is that users can find the required model by impression when they don't know the model name, or guide users to find the required model when the query purpose is not clear.

3.3.2 Query interface design

The query interface is divided into the left half and the right half. The left half is the tree view click part. Here, treeview control is used to sort out all the data in the database to form a tree view and carry out classified management. It supports browsing, double-click to open the tree view or double-click to select query.

At the top of the right part, the label control is used to make the title of the query interface, and the four words of "query result" are written. In the middle, 12 textboxes and 12 label controls are used to make the information display part, respectively displaying: name, purpose, wingspan, length, maximum take-off weight, maximum load, endurance time, farthest range, flight speed, practical lift limit, service time, and 12 parameters of the country. Below, a picture control is used to display the pictures obtained by querying the UAV, a TextBox control is used to input keywords, and three buttons made by command control are used to query, play relevant videos and return to the previous level. The implementation effect is shown in Figure 3.4：

Figure 3.4 Data query interface

3.4 Data maintenance function and interface design

The data maintenance function is only open to administrator users. The main functions are browsing data information, querying relevant data, adding relevant data, modifying relevant data, and deleting relevant data.

Above is the data browsing section. Data browsing is realized by DataGrid control and ADODC control. ADODC control is used to connect to the database, and relevant data is obtained from the database according to the requirements of the administrator, and displayed by DataGrid control above the data maintenance interface. Compared with other available controls, the DataGrid control has the following advantages：

Firstly, the DataGrid control can display multiple pieces of information, which can display the related data and information; secondly, the DataGrid control uses a table like display mode, in the display of related data and related parameters, the same column is the same kind of data, which is conducive to data processing, such as comparing data and filtering data; finally, the DataGrid control natively supports the number of databases According to the modification of, the administrator who successfully verifies in the verification process can directly add, change and delete relevant data in the control.

On the left side of the update interface, a picture control is used to display the UAV image. Here, the control can directly display the image according to the mouse focus in the DataGrid control, realizing the fast browsing of data. On the right side, a TextBox control is used for information input. The purpose is to find out a certain type of UAV or the UAV matching the keyword when the amount of data is large. Five buttons made by command control are used to query, add new model, modify picture, modify video and return to the previous level. Among them, the information entry window will appear when adding a new model. You can add a new model by inputting relevant parameters according to the prompts. Click the button below to add relevant pictures and videos. The effect is shown in Figure 3.5

Figure 3.5 Data maintenance interface

3.5 Easy to use design of software

In the design and use of DataGrid control in the data maintenance interface, we found two problems that can not be ignored. The first is that in the process of data display, if the original DataGrid control displays too much data, beyond the scope of DataGrid display box, it can only use the scroll bar to drag to display more content, and does not support mouse wheel to turn pages; the second is in the original setting The DataGrid control does not support the click operation. If you want to click a piece of data to view its pictures and videos, you can only use the command control association. These two problems are very serious about software friendliness, and also reflect the maturity of software.

This paper writes functional statements on the basis of the original DataGrid control to realize the control of the roller and improve the operation of DataGrid control.The first problem is datagrid1_ Gotfocus operation method, assignment statement is:

```
1.  Oldwinproc = GetWindowLong(Me.hwnd, GWL_WNDPROC)
2.  SetWindowLong Me.hwnd, GWL_WNDPROC, AddressOf FlexScroll
```

By editing the selection statement, the up and down scrolling is defined and made into a module, which is referenced in the DataGrid of the form. The key statements are as follows：

```
1.   Select Case wMsg
2.      Case WM_MOUSEWHEEL
3.            Select Case wParam
4.            Case -7864320        ' Roll down
5.                   SendKeys "{DOWN}"
6.
7.            Case 7864320         ' Roll up
8.                   SendKeys "{UP}"
9.            End Select
```

Through the above statements, we can realize the rolling operation of mouse pulley in DataGrid control as long as the mouse focus is in the space.The second problem is to assign a value to the TextBox control：

```
1.      DataGrid1.Col = 0
2.      Text1.Text = DataGrid1.Text
```

Click the DataGrid control to complete the query operation. The focal point of the mouse is the name to assign to the TextBox control. At the same time, the relevant picture information of the UAV is displayed, so there is no need to click the query button again. Through these two improvements, the operation mode and method are simplified, the query operation experience is greatly optimized, the fault tolerance rate of the software is improved, and the use mode of the software is improved, which makes the software easier to use.

4. Connection, installation and database migration

4.1 Connection mode and control used

In this software, two connection methods are used to connect with the background database. The two methods are compatible with each other and can be converted to each other, but they complement each other in terms of ease of use and operation.

The first connection method is ADODC control connection: ADODC control is a kind of control easy to use to connect with the background database, which supports access, my SQL, Oracle and other databases. The usage method is: select project in the upper menu bar of VB, select component in the drop-down menu, and find Microsoft ADO Data Control 6.0 (SP6) in the component tab. This is the control group of ADODC control. Check the box in front of it and click OK, as shown in Figure 4.1. Then you get the ADODC control.
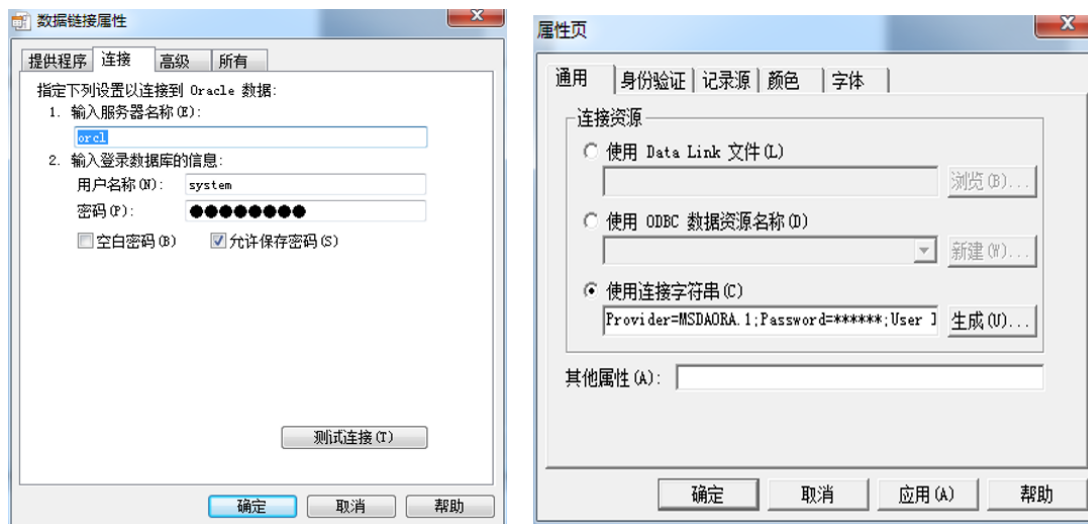
Figure 4-1 Database connection property page

In the control bar on the left, select ADODC to load into the form, right-click the control and select ADODC property to set relevant parameters. The setting method is: select to use the connection string, and then click the generate button to open the data connection property interface. On the provider tab, select Microsoft OLE DB provider for Oracle, in the "connection" tab, enter the server name (that is, the name of the established database), login database information (need to login the database account and password). Here, you need to pay attention to select allow to save password at the bottom. If you do not select this, the database related information will not be able to read the next time the form is loaded, which affects the overall migration of the software.

After setting, click test connection. If the connection is successful, it means that the database information is read normally and can be used. Then click OK in the data connection property interface and click OK in the property page interface to complete the configuration of ADODC control. Another small detail is that in the record source option of the property page, you can enter SQL statements in the command text for the statements to be executed when the control is loaded for the first time. For example, if you want to display a table as soon as the form is opened, enter "select * from table name" in it, so that the table can be displayed when the form is loaded for the first time.

The advantage of this connection mode is that all operations are visual operations, just like logging in to other software at ordinary times, you can select the correct attributes and enter the account password to log in. The operation is less difficult, easier to master and easy to use, and there is no language barrier. But because all the conditions are the default conditions of VB ADODC control, we can only choose among them, and can't customize them individually, so it's more rigid. When some controls don't support the data source referenced by ADODC, this connection method can't be used.

The second connection method is to use VB to connect Oracle's special statement, and write directly under the statement when clicking the button or window loading:

```
1.  Dim conn As New ADODB.Connection, rs As New ADODB.Recordset
2.  conn.Open "Provider=MSDAORA.1;Password=**********;User ID=system;Data Source=orcl;Persist Se
    curity Info=True"
```

Using this statement, we can realize the connection between VB and Oracle database.

This connection method makes up for the shortcomings of the first method, improves the flexibility of software design, has a larger user-defined space when using, and makes the interface more clean and beautiful. But because this method needs to learn the statement of VB connecting database, and each kind of database is not the same when connecting with VB, it causes a certain learning cost and operation difficulty, and it is easy to make statement errors when debugging.

4.2 Software installation and database migration

4.2.1 Software installation

Front desk software installation is divided into two cases. The first case is that the system itself has complete components, relevant compiling software, and can run exe files directly. In this case, the generated EXE file can be executed directly.

The second is that the system components may have incomplete places. Then, the installation process of the file needs to be performed. For example, open the package to directly execute the setup file, and you will see the user confirmation interface. The interface will prompt "the installer cannot install the system file being used or update the shared file being used. Before continuing, it is recommended to close any running applications. " This is to explain that if the database system needs to be updated, you need to shut down the running software before updating, and stop the shared file service to prevent software failure caused by installation errors. Click OK to go to the next step, select the directory to install, then click the Install button, wait a moment, and then install the software and system components needed to run the software into the specified directory.

4.2.2 Database migration

The migration of database can be divided into two cases: export and import with statements and cold copy. The principle of database migration is that the DMP files in the old database can be imported into the new database through statements, then the import and export can be directly executed by using statements, and the statements are：

```
1.  export exp system/manager inctype=complete file=文件名.dmp
2.  import imp system/manager inctype=RESTORE FULL=y FILE=A
```

Cold copy is to copy the database file directly to the new database directory, which is easy to operate, but in the process of operation, the database needs to be completely closed, otherwise the file may be incomplete.

5. Conclusion

In this paper, first of all, through understanding the principle of database, exploring and learning database technology, analyzing the design concept of database system and the methods and steps required by the design, the research scheme is determined. According to the specialty and particularity of UAV database query, this paper investigates the development and research status of relevant databases at home and abroad, and designs a characteristic UAV database management system.

In the aspect of database, Oracle, a relatively mature enterprise database development software of Oracle, is selected as the construction platform of background database. According to the requirements, a table space is established in the database, which includes 12 fields: name, purpose, wingspan, length, maximum take-off weight, maximum load, endurance time, farthest range, flight speed, practical ceiling, service time and country. These parameters describe the external characteristics and flight parameters of a UAV in detail. In the process of UAV flight test, they play an important role in UAV product positioning, UAV control, and even UAV product iteration.

In terms of software, Microsoft Visual Basic is selected as the platform, and ODBC based data connection specification is used to realize the access management and data maintenance of the database. This paper elaborates the design process of login interface, navigation interface, query interface, browse interface and data maintenance interface. The software is tested and evaluated from three aspects: compatibility, ease of use and fluency.

In today's information explosion, with the change of people's ideas, digital management will occupy a more and more important position. It is undeniable that the document management mode still has its irreplaceable advantages, but the advantages of digital management system become more and more obvious with the passage of time. Whether from the cost-effectiveness or from the loss rate, the digital management system will be in the file data management side It has an absolute advantage. The UAV database system designed in this paper changes the traditional data management method, improves the query efficiency of UAV related data, and provides a relatively perfect solution for UAV data management, which has high practical value.

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