

ORIGINAL RESEARCH ARTICLE

Design and Implementation of Taxi Management System

Yueming Peng, Shanshan Liu, Xinglong Dai

Computer Engineering, Shaoyang University of Science and Technology, Hunan, China

ABSTRACT

The growing economy and the information age have arrived. The life of a variety of information tends to be digital and clear. Taxi management system is born in such an environment, the increasingly developed traffic, taxi information is complicated. So we will play a huge computer storage space, high-performance processing power, highly reliable data security, clear visual data and other advantages to assist the management of the taxi management, to achieve a reasonable use of computer resources, and truly the purpose of reducing the labor force to improve the quality of labor. This paper mainly analyzes the main components of the system, including the demand situation, the design goal of the system, the data structure, the data flow and the main features of the system. The detailed ideas and implementation methods of the system function module are introduced, part of the source code for a detailed description.

KEYWORDS: Taxi management, Information systems, Databases, Controls, Forms

1. Preface

The expansion of the socialization of production, the progress of science and technology, the rapid growth of the total amount of human knowledge, and the increasingly fierce market competition, people's understanding of information has undergone a fundamental change. Information is listed as one of the three major resources of human society with material and energy side by side. Information level has become a measure of a country's level of modernization and comprehensive national strength of the important signs. China is also in the reform and opening up to further deepen the environment, so we should seize the opportunity to make full use of information, a solid information management system to do the basic work, the development of more advanced application system to accelerate the pace of China's information technology.

In recent years, with accession to the WTO, the pace of social life is accelerating, the taxi industry makes people to travel, improve travel efficiency, but also continue to develop. In order to better serve the majority of passengers, the major taxi companies have set up a variety of information management systems, such as car system, customer service system, and gradually formed a digital car rental management concept. That is, the network management as the basic model to information for the taxi industry, the basic driving force for the development of information technology to enhance the competitiveness of the taxi company's basic means to information technology for the development of taxi companies to grow new points to information culture changes people's education, working methods and ideas. Thus fundamentally to achieve the services of the majority of passengers, improve the efficiency of the taxi company's work and quality, for the taxi company to create economic benefits.

Drivers and rental vehicles is the most important resource of the taxi company, is to create a source of benefits and to improve the efficiency of the taxi company and service quality, first of all from the driver and vehicle management to proceed. One is to do the driver non-cash operating income distribution (liquidation) work, the driver's life insurance and other welfare work, the second is to do the vehicle insurance and maintenance work. Basic information management system needed for such management - Taxi company information management system, will largely solve the taxi company in this work on the difficulty. This article describes the 'taxi information management system', is based on a taxi company's information management system needs to start based on demand research. And to a certain extent, consider its scalability, so that the system development is completed, through a small amount of transformation, can be applied to other types of companies.

2. System background and research significance

2.1. Background

With the continuous development of computer technology, companies, enterprises and related computerized management gradually popularization, computer technology has been deep into all aspects of enterprise management. Transportation is an important infrastructure and basic industry of national economy and social development, and it is the lifeblood of economic operation. With the rapid development of the national economy, the continuous improvement of the transport infrastructure, the transport industry has also been rapid development, and a large number of vehicles operating arrangements need scientific management, which has become an important work in the transport industry. Transportation industry management system is to meet the various aspects of the transport industry management, records and query functions and revenue and expenditure situation, the design is derived from the transport industry on the taxi information management began to design. Information management of the department can reduce the waste of human resources, can make a small amount of personnel can bear the task of the daily work of the enterprise information management room. To further improve the quality of work services, give full play to the advantages of information resources.

2.2. Research significance and objectives

1.2.1 Research significance

The growing economy, the growing popularity of taxis, which makes the taxi vehicle information complicated. So we will play a huge computer storage space, high-performance processing power, highly reliable data security, clear visual data and other advantages to the management of rental vehicles to achieve a reasonable use of computer resources to improve the taxi industry Internal and the entire supply chain management of all aspects of the scheduling and resource allocation, making management reasonable norms. As far as possible reasonable control of the mode of operation, especially vehicles, personnel control and management, to understand the various aspects of the taxi industry management, records and query functions and revenue and expenditure situation, better optimize the taxi industry operations development. The real realization of the reduction of labor is to improve the quality of labor purposes.

With the globalization of economy and the deepening of China's economic reform, the taxi industry is facing increasingly fierce competition, improve the interior of the taxi industry and the entire supply chain management, scheduling and resource allocation, and quickly adapt to the customer's new Demand and market new opportunities, the Chinese transportation industry to win the competitive victory of the decisive factors, and quickly and effectively implement their own resource planning. One of the most effective ways to improve the competitiveness in the taxi industry[1].

1.2.2 Research objectives

The goal of this project is to use Visual Basic 6.0 programming to develop a set of applications in the transport industry on the taxi management information system, the application system will be mainly through the taxi information management system so that business managers can quickly and easily complete the data management tasks, So that managers to facilitate the rapid completion of the site, line, vehicle, driver information management and timely understanding of the company's operations and the corresponding information query. Further research on requirements, and constantly update the internal mechanisms to meet the multi-level requirements of the enterprise.

3. Introduction to development tools

3.1. Introduction to the database

2.1.1 SQL language

SQL is the abbreviation of Structured Query Language, the earliest developed by IBM in 1970, after the International Organization for Standardization ISO Association adopted as an international standard, which combines data manipulation, definition, control and management functions in one, easy to learn and use [2].

Advantages of SQL language:

Non-procedural language for set manipulation.

Integration.

- The common language of all relational databases.

2.1.2 ACCESS 2000 database

Access is Microsoft Corporation began in 1994 published computer database management system. As a powerful MIS system development tool, it has a friendly interface, easy to learn and use, simple development, flexible interface and other characteristics, is a typical new generation of data management and information systems development tools. Compared with other Microsoft database products such as FOXPRO, Access has a more unique advantage, providing a more powerful data organization, user management, security checks and other functions. The ACCESS application is mainly single-client applications. Basic to meet the design of the database needs. The goal of Microsoft is to make ACCESS the easiest database system for designing and managing applications. The main task of ACCESS is to store, manage and provision data to meet the needs of client connections and storage data [3].

Introduction to 2.2 Visual Basic 6.0

Visual Basic 6.0 is a new generation of software application development tools, in the database, network, cross-platform development has a strong function: an object-oriented visual design tools, event-driven programming mechanism, provides easy to learn and use the application integration development Environment, structured programming language, support for a variety of database system access, Active technology, VB6 in the development environment, network functions, such as enhanced, complete help online help function. Providing the scalability and reliability needed by businesses and Web developers while also supporting Web services that emerge from a variety of platforms.

Visual Basic 6.0 'object' from the perspective of visual programming, is a property (data) and behavior (event) method of the entity. Using Visual Basic 6.0 to develop database applications, the focus is dealing with a variety of database components, and database-linked component objects are 5, they are: ADODC (database session), Datagrid (database), DataList and DataCombo (data control components) Used to display the database information. Which followed by three commonly referred to as data access (DataAccess) components [4].

4. System Design Feasibility Study

4.1. System Overview

With the continuous development of computer technology, computerized management gradually popularization, computer technology has been deep into all aspects of enterprise management. The taxi industry has also developed rapidly. And a large number of taxi operating arrangements need scientific management, which has become a taxi management in an important work.

The main functions of the design system are:

Management of station information, management of line information, record of basic information of driver, record of basic information of vehicle business management - business records management, business management - vehicle maintenance records management check, business management - vehicle illegal record management, business Management - vehicle accident record management query statistical management, system user and rights management, system help and function brief

4.2. System design and architecture

3.2.1 System structure design

The system is divided into system welcome interface, site information management interface, line information management interface, driver file management interface, vehicle file management interface, vehicle operation record management interface, vehicle maintenance record management interface, vehicle violation record management interface, vehicle accident record Management interface, daily settlement, operational statistical query and user rights management interface.

3.2.2 System function module breakdown

According to the above analysis of the overall design of the system, the system can be divided into the following eight parts:

User management module, basic information module, file management module, block business management module, User rights module, daily settlement module, query statistics module, system help module.

5. Database design

Development of database application system can be divided into database analysis, design and application analysis, design two parts. The rational design of the background database in this kind of data information management system occupies a very important position, the database design will directly affect the system's accuracy, efficiency and effect, reasonable design can improve data storage efficiency, ensure data Complete and consistent [5].

5.1. Database requirements analysis

The specific needs of the system analysis are as follows:

- 1) Users can add and modify the site and line operations, and provides a quick query through the Pinyin function to help users quickly record the record management.
- 2) The user can maintain the driver file, add, modify and delete the operation, and through the name, ID number, gender, driver number and notes and other items on the driver file query (including the driver name, ID number, Fuzzy query, the rest for accurate inquiries).
- 3) Driver ID must be unique and vehicle license plate after 5 mark, so that one person a car corresponding.
- 4) The user can add, modify and delete the vehicle file, and can query the vehicle file by vehicle number, vehicle inspection, whether there are auto insurance and remarks, etc. (vehicle number and remarks are fuzzy query), vehicle ID must only.
- 5) The user can add, delete the personality and delete the vehicle operation record, and can query the vehicle operation record through the vehicle ID, the driver ID, the operation date and the remarks, etc. (which is the fuzzy inquiry).
- 6) The user can add, delete the personality and delete the vehicle maintenance records, and can query the vehicle maintenance records through the vehicle ID, maintenance date and remarks, etc. (which is the fuzzy query).
- 7) The user can add, modify and delete the vehicle violation records, and can query the vehicle violation records through vehicle ID, driver ID, vehicle violation date and remarks, etc. (which is a fuzzy query).
- 8) The user can add, modify and delete the vehicle accident record, and can inquire about the vehicle accident record by vehicle ID, driver ID, accident, date and remarks (which is the fuzzy query).

5.2. Database concept structure design

Through the above overall analysis, we can design a variety of entities to meet the needs of users, you can get the entity - relationship model is as follows:

- 1) Site information entity {site number, name, short code, location, alias, type, affiliated team}.
- 2) Line information entity {line number, site number, starting point, terminal, line name, line vehicle, line mileage}.
- 3) User entity {name, password, confirmation password, logo}.
- 4) Driver file entity {driver ID, driver name, driver ID number, driver gender, driver date of birth, driver number, driver phone, under the team name, driver's license number, driver's license deadline, Remarks}.
- 5) Vehicle file entity {vehicle file ID, vehicle number, record car name, vehicle purchase date, whether the annual inspection, whether the auto insurance, notes}.
- 6) Statistics entity {number, total income, total expenditure, date}
- 7) Profit Information Form Entity {No., Total Profit, Date}
- 8) Vehicle operation record {operation record number, operating vehicle ID, driver ID, operating date, operation receipt, note}.
- 9) Vehicle maintenance records {maintenance record number, maintenance vehicle ID, maintenance station, maintenance costs, maintenance date, note}.
- 10) Vehicle violation record {violation record number, illegal vehicle ID, violation of driver ID, violation of the reasons, illegal date, fines, notes}.

11) Vehicle accident record {accident record number, accident vehicle ID, accident driver ID, accident date, accident location, accident object name, accident ID number, accident object telephone, insurance claim amount, company burden, the amount of each other, }.

5.3. Database generation and configuration

4.3.1 Building a database

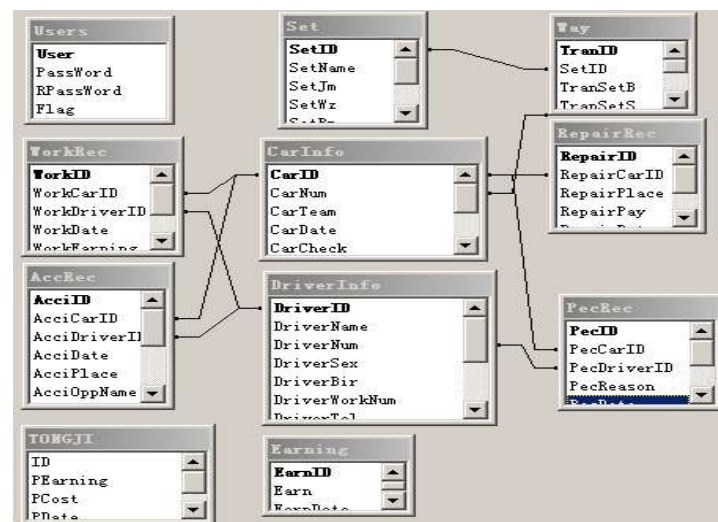
The database contains 11 data tables:

- 1) Data table for storing site information.
- 2) Data table for storing line information.
- 3) Data table for storing driver information.
- 4) Data table for storing vehicle profile information.
- 5) Data table for storing vehicle operating records.
- 6) Data sheet for storing vehicle maintenance records.
- 7) Data sheet for storing vehicle violation records PecRec.
- 8) Data sheet for storing vehicle accident records AccRec.
- 9) Statistical operating data sheet.
- 10) Earnings data sheet Earning.
- 11) User Information Table.

4.3.2 Establish the relationship between the data tables

After the establishment of the above data, the design of the relationship between the various data tables. According to the corresponding field between the attributes of the principle of matching, the table linked to each other but also help the query between multiple tables. After establishing the relationship between the data tables, the field properties of the relationship cannot be changed. To change, you must cancel the relationship, change the field properties and re-establish the connection. Therefore, we should establish and improve the relationship between the establishments of the table.

The establishment of a good database of the relationship between the tables as shown:



4.3.3 Database connection

Access to establish the database does not require database server support and Visual Basic comes with support, even if the system does not install Microsoft Office software, Visual Basic can also be used directly in the common module to achieve.

6. System main module design and implementation

6.1. Module design

5.1.1 System login interface design

When the system is running, first open the login form, only the authority of the user to enter the system. After landing, the system main interface will be displayed.

```
If Len (Trim (Me.Txtuser.Text)) <= 0 Then
MsgBox 'Please enter user name', 'login system'
Exit Sub
End If
If Len (Trim (Me.Text2.Text)) <= 0 Then
    MsgBox 'Please enter the login password', 'landing system'
    Exit Sub
End If
```

5.1.2 Main program interface design

The main interface mainly includes menu, toolbar, status bar, and program main window several parts. And the main form is an MDI form. This rejoins the form to design his subforms and to form a better management effect interface. This interface has the following features:

- 1) System main interface menu window.
- 2) System main interface toolbar window.
- 3) Call each child window.
- 4) About the interface.
- 5) Exit the system.

```
Me.TxtDate.Text = Format (Now, 'yyyy-mm-dd')
LastDay = DateAdd ('d', -1, Now)
If RsDB.RecordCount > 0 Then RsDB.MoveFirst
    For i = 1 To RsDB.RecordCount
        SEarning = sEarning + RsDB.Fields ('WorkEarning'). Value
        If Not RsDB.EOF Then RsDB.MoveNext
    Next i
    RsDB.Close
    For i = 1 To RsDB.RecordCount
        SPay = sPay + RsDB.Fields ('PecCost'). Value
    For i = 1 To RsDB.RecordCount
        SPay = sPay + RsDB.Fields ('AcciComPay'). Value
        If Not RsDB.EOF Then RsDB.MoveNext
    Me.TxtPay.Text = sPay
    Me.TxtPayoff.Text = sEarning - sPay
```

5.1.3 Driver / Vehicle Archives Management Module

Driver / vehicle management module main function:

- 1) Add, modify, and delete actions for driver / vehicle records.
- 2) Through the label components to the management module of the query module together to facilitate the user's operation and query. The control of the situation to be timely control of the record information is to do a quick query.
- 3) When the user selects a data in the DataGrid list, the system will automatically display the data in the 'Driver / Vehicle File Management' tab. And then click the [modify] button, the program checks the contents of each field to fill in the correct, the modified records will replace the original data in the DataGrid list. The DataGrid control and ADODC control bonding, and thus the driver file data table DriverInfo data associated with the DriverInfo data table will automatically modify the data, making this part of the code is very simple.

Private Sub Form_Load ()

Adodc1.ConnectionString = CnStr

```
Adodc1.RecordSource = 'Select DriverID as Driver ID,' \u0026 _
    'DriverName as name,' \u0026 _
    'DriverNum as ID number,' \u0026 _
    'DriverSex as sex,' \u0026 _
    'DriverBir as birth date,' \u0026 _
    'DriverWorkNum as work number,' \u0026 _
    'DriverTel as phone,' \u0026 _
    'DriverTeam as affiliated to the team name,' \u0026 _
    'DriverLicenceNum as driver's license number,' \u0026 _
    'DriverLicenceDate as driver's license deadline,' \u0026 _
    'Remark as note' \u0026 _
    'From DriverInfo'
```

Debug.Print Adodc1.RecordSource

Set DataGrid1.DataSource = Adodc1

End Sub

5.1.4 Vehicle Operation Module

Module main function:

- 1) Add, modify, delete and query operations information.
- 2) Since the vehicle ID driver ID in the vehicle operation record is associated with the vehicle ID in the vehicle profile data table CarInfo and the driver ID in the driver file data table DriverInfo, the control of the two options in the interface For a drop-down box that cannot be entered manually, the code will initialize it in the Form_load () procedure. That is, from the above two data tables to read the corresponding existing vehicle ID and driver ID.
- 3) vehicle operation record query function, when the text box to obtain the focus, the previous query type will be automatically selected.

If Me.OptQue (0) .Value = True Then

If Me.TxtQueName.Text = " Then

ElseIf Len (Trim (Me.TxtQueName.Text))> 4 Then

MsgBox 'query driver file'

Exit Sub

End If


```
DriverName = Replace (Trim (Me.TxtQueName.Text), " ',' ") '
Questr = 'select * from DriverInfo where DriverName like"% \u0026 DriverName \u0026%" '

```

5.1.5 Vehicle maintenance, illegal and accident record management module

3 modules mainly on the vehicle maintenance, illegal and accident information to do the record, the operation of the vehicle to do a good job, so that administrators fully understand the operation of the vehicle operating conditions of the driver. For the statistical operation of the company to provide financial resources, so as to better optimize the enterprise resource preparation, to mention the benefits of enterprises to create greater wealth [6].

The main function of this module:

- 1) Management and inquiries about vehicles, drivers, causes, fines, dates, and so on.
- 2) Management and inquiries about vehicles, drivers, causes, maintenance costs, dates, locations, and invoicing reimbursement for maintenance.
- 3) Information about the accident, such as vehicle, driver, cause, date, accident object information, accident compensation, insurance and other information management and inquiries.

```
If Me.TxtRemark.Text = vbNullString Then

```

```
    SqlStr = 'INSERT INTO RepairRec'

```

```
    SqlStr = SqlStr \u0026 '(RepairID, RepairCarID, RepairPlace, RepairPay, RepairDate)'

```

```
    SqlStr = SqlStr \u0026 'VALUES (' \u0026 Me.TxtID.Text \u0026 ', ' \u0026 Me.CmbCarID.Text \u0026 ', '

```

```
    SqlStr = SqlStr \u0026 " \u0026 Me.TxtPlace.Text \u0026 ', '

```

```
    SqlStr = SqlStr \u0026 " \u0026 Me.TxtCost.Text \u0026 ', '

```

```
    SqlStr = SqlStr \u0026 '# ' \u0026 Me.DTPDate.Value \u0026 '#);'

```

```
    Debug.Print SqlStr

```

```
    DBCn.Execute SqlStr

```

```
Else

```

```
Remark = Replace (Trim (Me.TxtRemark.Text), " ',' ")

```

```
    SqlStr = 'INSERT INTO RepairRec'

```

```
    SqlStr = SqlStr \u0026 '(RepairCarID, RepairPlace, RepairPay, RepairDate, Remark)'

```

```
    SqlStr = SqlStr \u0026 'VALUES (' \u0026 Me.TxtID.Text \u0026 ', ' \u0026 Me.CmbCarID.Text \u0026 ', '

```

```
    SqlStr = SqlStr \u0026 " \u0026 Me.TxtPlace.Text \u0026 ', '

```

```
    SqlStr = SqlStr \u0026 " \u0026 Me.TxtCost.Text \u0026 ', '

```

```
    SqlStr = SqlStr \u0026 '# ' \u0026 Me.DTPDate.Value \u0026 '#,'

```

```
    SqlStr = SqlStr \u0026 " \u0026 Remark \u0026 ');'

```

```
    Debug.Print SqlStr

```

```
    DBCn.Execute SqlStr

```

```
End If

```

6.2. Code implementation analysis

The main code is analyzed as follows:

Vehicle file management menu

```
Private Sub Car_Man_Click ()

```

```
FormCar.Show

```

```
OrmCar.SSTab1.Tab = 1

```

Vehicle file query menu


```

Private Sub Car_Query_Click ()
FormCar.Show
FormCar.SSTab1.Tab = 0
Driver File Management menu
Private Sub Dri_Man_Click ()
FormDriver.Show
FormDriver.SSTab1.Tab = 0
Driver file query menu
Private Sub Dri_Query_Click ()
FormDriver.Show
FormDriver.SSTab1.Tab = 1
Vehicle operating income
SqlStr = 'select WorkEarning from WorkRec where WorkDate = #'
If RsDB.RecordCount > 0 Then RsDB.MoveFirst
For i = 1 To RsDB.RecordCount
SEarning = sEarning + RsDB.Fields ('WorkEarning'). Value
The vehicle is fined
SqlStr = 'select PecCost from PecRec where PecDate = #'
If RsDB.RecordCount > 0 Then RsDB.MoveFirst
SPay = sPay + RsDB.Fields ('PecCost'). Value

```

7. Software system testing and maintenance

7.1. Software system testing process

The testing process of the software system is carried out in four steps: unit test, assembly test, validation test and system test. Unit tests focus on the use of source code to achieve each of the program unit to test, check the various program modules are correctly implemented to achieve the required functions. The integration test is based on the design of the software system architecture, the tested modules assembled in the assembly process, check the correctness of the program structure. The validation test is to check whether the implemented software system meets the requirements identified in the requirements specification and whether the software configuration is complete and correct. The system tests incorporate the already validated software system into the actual operating environment and combine it with other system components for testing.

7.2. System maintenance

6.2.1 Basic concepts of system maintenance

System maintenance is to ensure that the various elements of the system with the environment changes are always in the latest, the correct working condition. The purpose of system maintenance is to ensure that the management information system is normal and reliable operation, and can make the system continue to improve and improve to fully play a role.

6.2.2 Contents of system maintenance work

System maintenance is for the various components of the system, according to the maintenance of different objects, the system maintenance content can be divided into the following categories:

1) System application maintenance. The process of business process is realized by applying the operation of the library. Once the program has changed or the business has changed, it will inevitably cause the modification and adjustment of the program. Therefore, the main activity of the system maintenance is to maintain the program.

2) Data maintenance. The demand for data for business processes is constantly changing. In addition to regular updates of the main business data in the system, there are many data that need to be updated from time to time, or with changes in the environment and business, as well as data content Increase, adjust the data structure. In addition, the data backup and recovery, etc., are data maintenance work content.

3) Code maintenance. With the expansion of the scope of application of the system, changes in the application environment, the system code needs to be a certain degree of increase, modify, delete, and set the new code.

4) Hardware maintenance. Mainly refers to the host and peripherals of the daily maintenance and management, such as machine parts cleaning, lubrication, equipment failure maintenance, vulnerability parts replacement. It should be responsible for the person, regular, to ensure the normal operation of the system.

8. Conclusions

After more than two months of investigation, research, analysis, design and development, the basic management of the taxi management information system is completed. Its function basically meet the demand, to achieve the management of the site and the line and the driver and vehicle file operation, followed by the vehicle operation must also be carried out, maintenance, illegal, accident and other major aspects of the management function. Of course, it is essential to insert, modify, delete and query the above data. In addition, the design can use the above data sheet to achieve the daily balance of payments and operation statistics.

Although the Visual Basic structure is very complex, there are many difficulties to learn, but once mastered its characteristics can be very good use of its function. Through the design of this system, I learned how to create an application, how to design a software, independent thinking. From the beginning of the design of the system structure, analysis of how to start, how to design, so I mastered how to distribute the development of application software. The learning made me understand the development environment of VB, and object-oriented language from the initial understanding, to achieve a simple development and application.

Due to the hasty time, coupled with my limited capacity, the system there are many deficiencies, the function is not complete, such as the lack of financial management and pricing management module in this system. There are still many other shortcomings in the system.

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