

Research and Implement of Enterprise Telephony Customer Service Management System

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Abstract—For some enterprise telephone customer service needs, and according to the design scale, service scope, cost factor of the system, this paper gives a research on Computer Telecommunication Integration (CTI), database access and other related technology, proposes a network communication customer service model in this paper based on B/S structure. Also, it builds an enterprise customer service management system program using DJ801A voice card, designs friendly interface and implements some functions such as customer management, staff management, product information management and telephone voice response. This system uses C# development language in Visual Studio 2008 platform to develop the telephone systems and enterprise information management software based on ASP.NET.

Index Terms—Telephone customer service, voice card, management system, NET technology.

I. INTRODUCTION

With the increasing applications of information technology, consumers are proposing higher and higher demands to the service quality of enterprises. Obviously, those who operate and service in traditional way cannot satisfy customers' requirements. Telephony system can not only effectively and quickly improve the business services, increase customer satisfaction, but also reduce operating costs, improve business networks and marketing tool. In this paper, the "intelligent enterprise telephony customer service system design" is proposed based on the above background, and a customer service telephone voice system is implemented using Browser/Server (B/S) structure.

II. SYSTEM PROGRAM DESIGN

This system is an integrated information service platform including telephone voice, computer networks and database technology. It can provide customers with a new service approach and service window. The computers automatically answer calls from customers, then, with the back-end database connected to other management systems or office automation system, it can provide automated voice services, and working hours of artificial voice services, so that customers can ask questions, check the product information and make suggestion by phone.

Telephony customer service management system consists of hardware and software systems. The telephone can be

interconnected with the computer hardware by inserting telephone voice card into any expansion slot of the computer and connecting to the telephone line. The software system is the function implemented in the telephone interface based on the customer service management system.

The structure of hardware system is shown as Fig. 1.

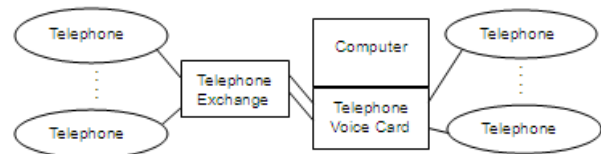


Fig. 1. Hardware structure.

The software structure is shown as Fig. 2.

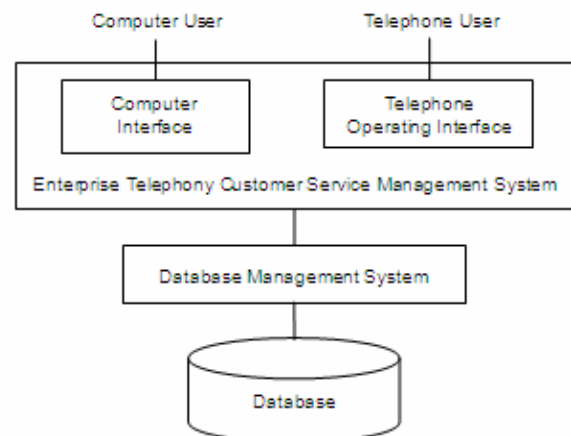


Fig. 2. Software structure

III. SYSTEM OVERALL DESIGN

The system needs computer application as a server, using Visual Studio 2008 tools platform, ASP.NET development technology. We chose D081A voice card from Dongjin Company to connect computers and telephone lines. The division of overall functional modules of the system is shown as Fig. 3.

IV. IMPLEMENTATION OF SYSTEM

A. Configuration of Voice Card

The system uses DJ801A analog voice cards from Dongjin Company, and configures outside module M2U, inside module MTU. M2U is used to detect outside perimeter ring signal and control outside hook. MTU is used to detect seats hook, seat feed calls and ring, and seat for the relay card [1]. The appearance of the DJ801A from Dongjin is shown as Fig. 4. The configuration and usage can be seen in reference

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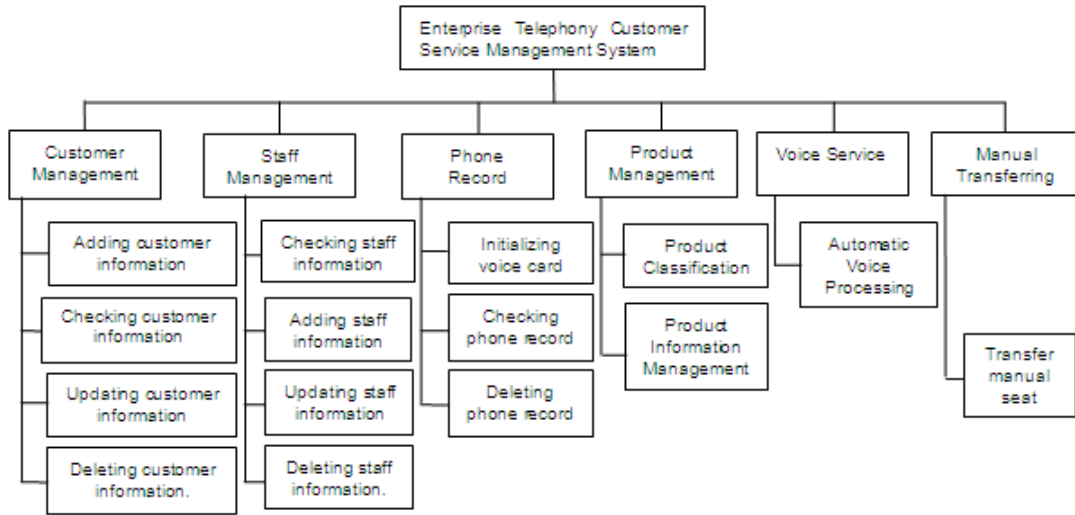


Fig. 3. Division of the system function.



Fig. 4. DJ801A voice card.

A. Design of Database

According to the division of the module functions, we designed customer table, staff table, product table, product type table, phone record table.

Customer Table (Including customer ID, customer name, company name, company address, telephone, Email, product bought, amount, sum, remark);

Staff Table (Including staff ID, staff name, account, password, sex, age, education background, address, telephone, Email, remark);

Product Table (Including product ID, product name, product type, price, inventory, introduction, details);

Product Type Table (Including type ID, type name, type description);

Phone Record Table (Including record ID, calling time, calling number, receiving channel, record summary).

B. Design of Administrator Module

After the administrators log in the system, they can operate the modules such as customer management, product management, staff management, phone record management.

- The main function of customer management includes checking customer information, adding customer information, updating customer information and deleting customer information.
- The main function of staff management includes checking staff information, adding staff information, updating staff information and deleting staff information.
- The main function of product management includes adding product information, checking product information, updating product information and deleting product information.

- The main function of phone record management includes initializing voice card, checking phone record and deleting phone record.

C. Design of Voice Card Control Management Module

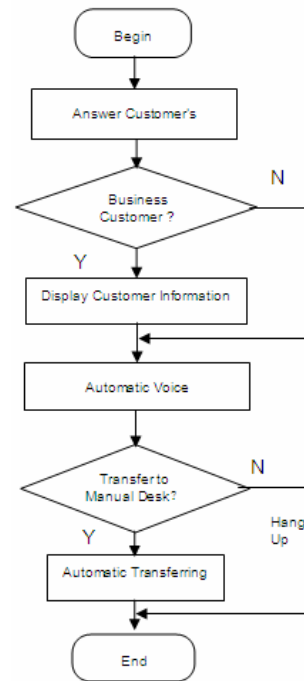


Fig. 5. Voice card control process.

The control of voice card is mainly designed to make computer and voice card hardware interoperated. We divided this module into three parts based on the voice card's hardware capabilities and development needs. The three parts include answering customer calls, handling customer keys and auto-switching. The work process is shown as Fig. 5.

- When a call comes, the voice card automatically answers the user's call and access the calling number, then retrieve the number in the database. If there exists business, the information of the customer will be displayed. Otherwise, information of the new customer will be displayed, and the voice will be recorded. In the design process, the statement of implementing the

call answering through the import of dynamic link library function is shown below.

```
[DllImport("Tc08a32.dll", CharSet = CharSet.Auto)]  
public static extern void OffHook(short wChnlNo);
```

The statement of detecting calling information by functions is shown below.

```
[DllImport("Tc08a32.dll", CharSet = CharSet.Auto)]
```

When a call is connected, it will play the given welcome words, accept the customer key, and move to the next step like voice playback or other functions according to the customer's key. The specific statement implemented by calling dynamic link library function is shown below.

```
[DllImport("Tc08a32.dll", CharSet = CharSet.Auto)]  
public static extern void StartPlay(short wChnlNo, byte[]  
PlayBuf, int dwStartPos, int dwPlayLen);
```

The statement receiving the user's key (DTMF Code) is shown below.

```
[DllImport("Tc08a32.dll", CharSet = CharSet.Auto)]  
public static extern short GetDtmfCode(short wChnlNo);
```

When the user selects to transfer to manual units, the system will transfer to the inside channel, to achieve the connecting calls between outside and inside (customers and operators). It detects the state of the inside channel by calling dynamic link library function. When the detected state is idle, connect the two channels. The specific statement is shown below.

```
[DllImport("Tc088a32.dll", CharSet = CharSet.Auto)]  
public static extern long ClearLink(short ChannelNo, short  
wAnother);
```

V. CONCLUSION

With the increasing applications of information technology, communication, computer and information fusion technology become the development hotspot. In this paper, a hardware program that meets the enterprise customer service requirements is proposed, using VisualStudio 2008 development platform. Then, telephone voice system and enterprise information management application software is designed based on ASP.NET. It implements the combination of telephone network voice flow and computer data flow, and improves the company's customer service management

platform.

ACKNOWLEDGMENT

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