

PAPER • OPEN ACCESS

A Solution to Mongolian Database Application System Based on WPF

To cite this article: Chunsheng Zhang and Ya Tu 2018 *J. Phys.: Conf. Ser.* **1069** 012055

View the [article online](#) for updates and enhancements.

Related content

- [Software](#)
- [Design and Implementation of Productivity Monitoring System in Rubber Injection Molding Machine in Real Time Based on Visual Studio and Android Application](#)
M Rubenstein, D Handaya and W Slamet
- [Defence and development](#)
Philip Gummert



IOP | ebooks™

Bringing you innovative digital publishing with leading voices to create your essential collection of books in STEM research.

Start exploring the collection - download the first chapter of every title for free.

A Solution to Mongolian Database Application System Based on WPF

Chunsheng Zhang¹ and Ya Tu¹

¹College of Computer Science and Technology Inner Mongolia University for Nationalities, Tongliao, china
E-mail: zhangcs_817@163.com

Abstract. As the mainstream programming platform is not compatible with the traditional Mongolian database application system, the traditional Mongolian database application system basically adopts the two technologies of ActiveX and CSS. These two kinds of technology have the specific function of the defects that the user needs to customize display usage, and such technology discard the components bundled. These defects make the traditional Mongolian database application system design very complex without a common and convenient solution. This paper applies WPF technology in Visual Studio 2010 to traditional Mongolian database application system design, rather than using ActiveX and CSS. The method realizes the display of Mongolian text through simple geometric transformation, while preserving all the functions of Visual Studio original components, which can speed up the development of the program. In addition, this solution overcomes the limitations of executing SQL statement errors in traditional Mongolian environments, which are versatile and can be widely used.

1. Introduction

Today's society has entered the era of big data [1], requirements about speed and quality of information processing are getting higher. The development of the traditional Mongolian system has made some achievements. There are a lot of systems developed based on traditional Mongolian, such as C/S-based management system [2-4], B/S-based Web site [5-7]. As the market booming demand for mobile client, Android platform system development based on the traditional Mongolian environment has become a hot topic in research area [8-10]. Traditional Mongolian language belongs to the Chinese category, especially its writing rules ("from top to bottom, from left to right") are special, and making the world's mainstream system development platform does not support display, especially because of the limitations of Unicode fonts. It is difficult to form a widely recognized mature technology. Therefore, so far, the degree of the traditional Mongolian database application system R&D completion cannot meet the growing needs of the society [11-12].

Windows system has embedded Unicode Mongolian font and input method since Windows 7, this paper uses display and program logic separation technology from visual Studio platform, for example, using WPF technology under C/S mode, using Silverlight technology under B/S mode, and shows Mongolian through basic transformations(such as control rotation) and combined transformations. This technology not only implements the traditional Mongolian text display rules, but also retains all the functions of the original components, and can support quick program development. The technology is based on Visual Studio development platform, and takes full advantage of the powerful features of Visual Studio, while directly applying its component function to develop program without substantial changes. Therefore, the technology is versatile, and it will be easily accepted by the user.



2. Mongolian Database Application System Status Quo

The current development of the traditional Mongolian database application system is mainly achieved through two technologies, ActiveX [13] and CSS [14-15].

2.1. Realization of Traditional Mongolian Database Application System Based on ActiveX Technology

ActiveX control is a standard COM object, an object of automation components, and an interface element. We can customize the ActiveX control to display the traditional Mongolian and to achieve the corresponding database processing functions based on the traditional Mongolian. Generally, customizing ActiveX controls can complete by C++. Developers can customize their ActiveX control's properties, timing, and methods to implement its database manipulation functionality, which can also be called by other development platforms due to its versatility. At present, most of the database applications based on traditional Mongolian language are implemented by using this technology.

2.2. Realization of Traditional Mongolian Database Application System Based on CSS Technology

CSS is also called Cascading Style Sheets, and the description of the display objects is implemented by markup language. We can display the traditional Mongolian under the rule of "top-down, left-to-right" by executing Writing-mode: tb-lr. IE browser support Writing-mode style while other browsers need jump to IE to achieve the basic traditional Mongolian document display functions. This technique simply describes the appearance of an existing control and does not change the properties, events, and methods that are embedded in the control.

2.3. Problems

Although Windows Form and B/S-based applications can be developed using ActiveX and CSS, these applications have fatal flaws.

2.3.1. Lack of Versatility. ActiveX controls are often tailored to a particular application and therefore do not have the versatility to use.

CSS can only achieve the traditional Mongolian display function, the user's definition is generally more customized according to individual program requirements, and therefore do not have versatility.

2.3.2. Discarding Interactive Features. Visual Studio provides powerful component functions for the development of C/S and B/S projects. The organic combination of various components makes database operation quick and easy. Customizing ActiveX controls are equivalent to discarding these existing functions. At the same time, custom components cannot achieve original functions Visual Studio platform. It will become very difficult to develop an application and programming will be extremely complex. Due to the man-machine friendly environment has been destroyed, some of the features are almost impossible to achieve.

2.3.3. Execution Command Error. Due to the custom control abandoned Visual Studio platform powerful component functions, developers need to use the command to complete the database operation. When updating the database data through the traditional Sql Command object and SQL statements such as Insert and Update, Mongolian stored in the database cannot be correctly identified, and therefore database operations cannot be implemented due to different library coding standards. If developers used the powerful component functions of the Visual Studio platform, such as Data Adapter objects, Data Set objects, Data Table objects, and Data Row objects, Unicode legacy Mongolian encodings will be fully recognized.

3. Introduction of WPF

WPF is the acronym for Windows Presentation Foundation, translated in Chinese as "Windows Presentation Foundation," introduced by the .NET Framework 3.0. WPF, Windows Communication Foundation and Windows Workflow Foundation are three major application development libraries for the new generation of Windows operating systems and WinFX.

WPF is Microsoft's next-generation graphics system that provides a unified description and method of operation for user interfaces, 2D/3D graphics, documents and media. It enables the animation and transformation of interface elements, and it is such geometric transformation that makes it adaptable to the traditional Mongolian "top-down, left-to-right" display rule. Because WPF technology separates the interface and program logic, when we transform the interface elements, it does not affect the powerful database manipulation functions of element bundling.

4. WPF Mongolian Control Generated

The key to WPF technology on the Visual Studio platform is that the display interface and program logic are separated. The original intention of this technology is to give the display operation a more powerful presentation based on the separation of the display interface and the program logic, that is, realize more brilliant visual effects by using complex operations such as 2D/3D conversion and animation functions. This feature is suitable for the traditional Mongolian program display function, which provides a new way for program design based on traditional Mongolian language.

4.1. Control Rotation Function

The main method of this paper is to use the feature that the WPF interface and program logic are separated, then realize displaying the traditional Mongolian text by means of geometric transformation and other means. The rotation of the control is the most crucial core transformation. Control rotation transformation common commands are as follows.

```
<Control type.RenderTransform>
  <RotateTransformx:Name=" Rotation control sequence number " Angle=" Rotation angle " />
</Control type.RenderTransform>
<Control Type.RenderTransform>
  <RotateTransformx:Name=" Rotation control sequence number " Angle=" Rotation angle " />
</Control Type.RenderTransform>
```

4.2. Key Control Generation Method

4.2.1. Simple Control Transformation. A simple control refers to a relatively simple control, such as: labels, text boxes, command buttons and other controls, which can be transformed by a simple rotation.

The following text box control is an example for illustrating the transformation process. As we can tell from Figure 1, the label on the left of Figure 1 represents the Mongolian text displayed by the normal text box control, with all text rotated 90 degrees to the left compared to normal text. Letting the textbox control rotate 90 degrees to the right to get the content shown in the text box to the right of Figure 1, which fits the requirements of traditional Mongolian display rules. Therefore, the simple controls involved in this article are all rotated 90 degrees to the right to meet the traditional Mongolian display rules.

Example:

ᠮᠣᠩᠭᠣᠯᠠᠨ ᠤᠯᠤᠰ :Mongolian

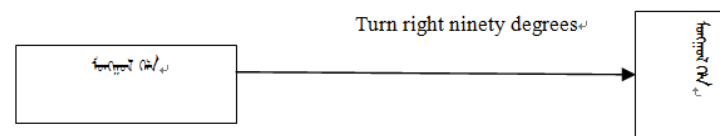


Figure 1. Text box control rotation transformation

4.2.2. Complex Control Transformation. Complex control transformation is relatively more complex, such as list boxes, combo boxes, tables and other controls. The correct display of traditional Mongolian needs a complex transformation.

We use the text box control as an example to illustrate the transformation process.

Example:

ᠤᠯᠤᠰ :Table header

ᠠᠨᠠᠭᠤᠯᠤᠰᠤᠨ :Table contents

ᠠᠨᠠᠭᠤᠯᠤᠰᠤᠨ	ᠠᠨᠠᠭᠤᠯᠤᠰᠤᠨ
11	12
21	22
31	32

Figure 2.Original form control

ᠠᠨᠠᠭᠤᠯᠤᠰᠤᠨ 1	ᠠᠨᠠᠭᠤᠯᠤᠰᠤᠨ 2
11	12
21	22
31	32

Figure 3. Rotate 90 degrees to the right

ᠠᠨᠠᠭᠤᠯᠤᠰᠤᠨ	ᠠᠨᠠᠭᠤᠯᠤᠰᠤᠨ
11	12
21	22
31	32

Figure 4. Remove the header

ᠠᠨᠠᠭᠤᠯᠤᠰᠤᠨ 1	ᠠᠨᠠᠭᠤᠯᠤᠰᠤᠨ 2
11	12
21	22
31	32

Figure 5. Add header to the left

ᠠᠨᠠᠭᠤᠯᠤᠰᠤᠨ 31	ᠠᠨᠠᠭᠤᠯᠤᠰᠤᠨ 32
11	12
21	22
1	2

Figure 6.Form content reverse order

Transformation process:

(1) Rotate 90 degrees to the right

Rotate the original form control (Figure 2) 90 degrees to the right (Figure 3).

(2) Hide table header

In Chinese, the table header is above. In Mongolian context, the table header is on the left. At this time, the header is on the right (as shown in Figure 3), so we first hide the right header (Figure 4).

(3) Add the table header on the left

Generate a text box with the same column in Figure 3 portfolio to display the Mongolian title, then add it to the specified location (Figure 5).

(4) The contents of the form are displayed in reverse order

As shown in Figure 5, the display method is very close to the traditional Mongolian display rule "from top to bottom, from left to right", except that the contents in the table are "right to left". The solution is to set the record_id self-growth field in each table to identify the record sequence, and then reverse the table data source conversion, which means add the predicate "order by record_id desc", then we can implement the "top to bottom, left to right" display rules of traditional Mongolian in the table style. (Figure 6).

Due to the variety of complex controls, we do not explain all the operations, but using this scheme enables the display of traditional Mongolian controls in complex controls.

4.3. Program Logic Implementation.

Because the WPF technology interface is separated from the program logic, during the interface description, the developer should indicate the corresponding event of the control, and implement the event accordingly in the program. The following is an example of the dg_cx_fj table control.

First of all, we describe the appearance of the Data Grid in XAML language, and explain the data source binding with `Items Source="{Binding}"`, and also use `Selection Changed="dg_cx_fj_Selection Changed"` to indicate that when the Data Grid option changes, the Data Grid's `dg_cx_fj_Selection Changed` event will be triggered.

```
<Data Grid Auto Generate Columns="False" Canvas. Left="1569" Canvas. Top="6"
Height="1017" Name="dg_cx_fj" Width="236" Font Size="18" Column Header Height="0" Items
Source="{Binding}"
SelectionChanged="dg_cx_fj_SelectionChanged"HorizontalScrollBarVisibility="Hidden"      Border
Brush="Black">
```

```
<Data Grid Columns>
<Data Grid Text Column Width="226" Binding="{Binding Path=p_name}"/>
<Data Grid Text Column Header=" ပုံစံအမျိုးအမည် " Visibility="Hidden" Binding="{Binding
Path=p_code}"/>
```

Path	Grid	Text	Column	Header="Pinyin code"	Visibility="Hidden"	Binding="{Binding Path=p_code}"

<Data	Grid	Text	Column	Header="ལོ་རྒྱུས་ཀྱི་གནད་དོན"	Visibility="Hidden"	Binding="{ Binding
Path=p_c_id}"/>						

<Data Grid Text Column Header=" Classification number " Visibility="Hidden" Binding="{Binding Path=p_c_id}"/>

```
<Data Grid Text Column Header="  " Visibility="Hidden" Binding="{Binding Path=p_id}"/>
```

<Data Grid Text Column Header=" Formula number" Visibility="Hidden" Binding="{Binding Path=p_id}"/>

</Data Grid. Columns>

<Data Grid. Render Transform>

<Rotate Transformx: Name="rotateTransform10" Angle="90" />

</Data Grid. Render Transform>

In program logic, the dg_cx_fl_Selection Changed event of the dg_cx_fj data table should be processed in time.

```
private void dg_cx_fl_SelectionChanged(object sender, Selection Changed Event Args e)
{
    try
    {
        pc_id = Int 32. Parse (((((DataGrid) sender).SelectedItem) as Data Row View)["c_id"].To String());
        dv_fj_fj = data Set. Tables ["prescription"].Default View;
        dv_fj_fj.Row Filter = "p_c_id=" + pc_id.To String ();
        dg_cx_fj. Data Context = dv_fj_fj;
        //Set function button
        btn_yw_append.Is Enabled = true;
        .....
    }
    catch (Exception ex)
    {
        tb_message. Text = "ሰላምታዊ ስህተት ሲከሰት ለማረጋገጥ ይዘውጡ";
    }
}
```

5. Applications

Based on the project of "Key Technology Research of Mongolian Medicine Prescription Data Mining" funded by the National Natural Science Foundation of China, this paper applies Visual Studio 2010 WPF technology to realize the design of Mongolian version, makes full use of the functions of the original control and makes the database easy to operate. Figure 7 is the prescription composition query and maintenance interface.

6. Conclusion

In the researching process of the China National Natural Science Fund Project of "the key technologies of Mongolian prescription data mining", this paper designed the traditional Mongolian Mongolian medical prescription data mining system with Visual Studio 2010 WPF technology, and broke the tradition that utilizing ActiveX and CSS traditional to develop Mongolian version software. The proposed technique realized the design of the traditional Mongolian database application system through simple geometric transformation while retaining all the functions of the original Visual Studio components. The technology can support rapid development of the program, while overcoming the limitations of executing SQL statement errors in traditional Mongolian environments. Such technology is versatile and can be widely used.

The screenshot displays a complex software interface for maintaining Mongolian prescription compositions. It features a sidebar on the left with a list of items and their associated numerical values. The central workspace is divided into multiple sections: a top section with three vertical sliders, a middle section with several tables and lists of Mongolian text, and a bottom section with more tables and a summary area. The interface is designed for detailed data management and editing of prescription compositions.

Figure 7. Mongolian prescription composition maintenance procedures

7. Acknowledgments

This work was supported by the National Natural Science Foundation of china(81460656) and the Higher Learning Science Research Project of Inner Mongolia Autonomous Region(Item Number: NJZY17199)

8. References

- [1] Yinhua H 2016Development of semantic information knowledge-base in Mongolian *Computer Engineering and Applications* **52**(10) pp128-134
- [2] Genhua M 2015 Design and development of curriculum observation system for Mongolian teaching normal students---a case study in inner Mongolia normal university
- [3] Lizong Y 2011Mongolianmangagementsystem base on “NNT” office system *Inner Mongolia University*

- [4] Lihong Z 2011 Design and realization of embedded Mongolian information processing platform *Inner Mongolia University*
- [5] Ketu C, Jiya M H 2009 Comparison of several Mongolian web production technology *Inner Mongolia Science Technology & Economy* **1**pp 66-67
- [6] Junying K 2012 A study of the backstage management system about Mongolian website doctoral dissertation *Jilin University*
- [7] YongpingY, Shan J, Qinggeertu, et 2012 Research of MenkCMS Mongolian web production technology *Inner Mongolia Science technology & Economy* **22(11)** pp69-70
- [8] Andi G 2015 The design and implementation of Mongolian weather forecast client widget based on androiddoctoral dissertation *Inner Mongolia University*
- [9] Jianmin M 2014 Design and implementation of Mongolian basic widgets based androiddoctoral dissertation *Inner Mongolia University*
- [10] Zhongwei Z 2014 The research and implementation of Mongolian extension to swing and android UI components doctoral dissertation *Inner Mongolia Normal University*
- [11] XuesongH, XilianL, Siguang H 2014Establishment of Mongolian website based on ASP, NET and problems analysis *Electronic Technology and Software Engineering* **10**pp 36-37
- [12] Yanhua B2009Thoughts on the current situation and development trend of Mongolian website *Journal of Hulunbeier College***17(4)**pp16-18
- [13] YanL, Ya T 2014 Research on Mongolian editing technology based on ActiveX control *Computer CD Software and Applications* **17** pp165, 167
- [14] Lige B 2014 Technology research of Mongolian groupware based on flex *Hebei University of Technology*
- [15] Bin F 2011A analysis of digital Mongolian form of the font ---interactive tools based on the design of multimedia database *Inner Mongolia Agricultural University*