Articles / Desktop Programming / WPF

C# .NET XAML WPF

WPF simple zoom and drag support in a ScrollViewer

Kevin Stumpf

Rate me: ★★★★★ 4.98/5 (60 votes)

6 Nov 2013 CPOL 171.4K 10.3K 65 30

A sample describing a way to zoom with the mouse wheel or a slider and drag limited content which is hosted by a ScrollViewer.

Download demo - 24.3 KB

Introduction

I've been looking for a while for Open Source solutions that show a simple way of zooming and dragging arbitrary content which is hosted and managed by a ScrollViewer.

As I did not find a free one, I decided to write my own one and share it with you. It supports zooming by a slider as well as by the mouse wheel.

Using the code

If you have any questions regarding the usage, please feel free to post and I'll try to get back to you ASAP.

The main view is defined by the XAML below. The content that is to be zoomed and dragged is part of the "grid" control.

XML Shrink ▲

```xml
<Window x:Class="ZoomExample.MainWindow"
        xmlns="http://schemas.microsoft.com/winfx/2006/xaml/presentation"
        xmlns:x="http://schemas.microsoft.com/winfx/2006/xaml"
        Title="MainWindow" Height="500" Width="500">
    <Window.Resources>
        <ResourceDictionary>
            <ResourceDictionary.MergedDictionaries>
                <ResourceDictionary Source="Resources.xaml"/>
            </ResourceDictionary.MergedDictionaries>
        </ResourceDictionary>
    </Window.Resources>
    <Grid>
        <Grid.ColumnDefinitions>
            <ColumnDefinition Width="Auto"/>
            <ColumnDefinition Width="*"/>
        </Grid.ColumnDefinitions>
        <Slider Grid.Column="0" Orientation="Vertical"
           HorizontalAlignment="Left" Minimum="1" x:Name="slider"/>
        <ScrollViewer Name="scrollViewer" Grid.Column="1"
              VerticalScrollBarVisibility="Visible"
              HorizontalScrollBarVisibility="Visible">

            <Grid Name="grid" Width="400"
              Height="400" RenderTransformOrigin="0.5,0.5">
                <Grid.LayoutTransform>
                    <TransformGroup>
                        <ScaleTransform x:Name="scaleTransform"/>
                    </TransformGroup>
                </Grid.LayoutTransform>
                <Viewbox Grid.Column="0" Grid.Row="0">
                    <ContentPresenter Content="{StaticResource Kompass}"/>
                </Viewbox>
            </Grid>

        </ScrollViewer>
    </Grid>
</Window>
```

Zooming and dragging is managed by the code-behind:

C# Shrink ▲

```csharp
public partial class MainWindow : Window
{
    Point? lastCenterPositionOnTarget;
    Point? lastMousePositionOnTarget;
    Point? lastDragPoint;

    public MainWindow()
    {
        InitializeComponent();

        scrollViewer.ScrollChanged += OnScrollViewerScrollChanged;
        scrollViewer.MouseLeftButtonUp += OnMouseLeftButtonUp;
        scrollViewer.PreviewMouseLeftButtonUp += OnMouseLeftButtonUp;
        scrollViewer.PreviewMouseWheel += OnPreviewMouseWheel;

        scrollViewer.PreviewMouseLeftButtonDown += OnMouseLeftButtonDown;
        scrollViewer.MouseMove += OnMouseMove;

        slider.ValueChanged += OnSliderValueChanged;
    }

    void OnMouseMove(object sender, MouseEventArgs e)
    {
        if (lastDragPoint.HasValue)
        {
            Point posNow = e.GetPosition(scrollViewer);

            double dX = posNow.X - lastDragPoint.Value.X;
            double dY = posNow.Y - lastDragPoint.Value.Y;

            lastDragPoint = posNow;

            scrollViewer.ScrollToHorizontalOffset(scrollViewer.HorizontalOffset - dX);
            scrollViewer.ScrollToVerticalOffset(scrollViewer.VerticalOffset - dY);
        }
    }

    void OnMouseLeftButtonDown(object sender, MouseButtonEventArgs e)
    {
        var mousePos = e.GetPosition(scrollViewer);
        if (mousePos.X <= scrollViewer.ViewportWidth && mousePos.Y <
            scrollViewer.ViewportHeight) //make sure we still can use the scrollbars
        {
            scrollViewer.Cursor = Cursors.SizeAll;
            lastDragPoint = mousePos;
            Mouse.Capture(scrollViewer);
        }
    }

    void OnPreviewMouseWheel(object sender, MouseWheelEventArgs e)
    {
        lastMousePositionOnTarget = Mouse.GetPosition(grid);

        if (e.Delta > 0)
        {
            slider.Value += 1;
        }
        if (e.Delta < 0)
        {
            slider.Value -= 1;
        }

        e.Handled = true;
    }

    void OnMouseLeftButtonUp(object sender, MouseButtonEventArgs e)
    {
        scrollViewer.Cursor = Cursors.Arrow;
        scrollViewer.ReleaseMouseCapture();
        lastDragPoint = null;
    }

    void OnSliderValueChanged(object sender,
         RoutedPropertyChangedEventArgs<double> e)
    {
        scaleTransform.ScaleX = e.NewValue;
        scaleTransform.ScaleY = e.NewValue;

        var centerOfViewport = new Point(scrollViewer.ViewportWidth/2,
                                         scrollViewer.ViewportHeight/2);
        lastCenterPositionOnTarget = scrollViewer.TranslatePoint(centerOfViewport, grid);
    }

    void OnScrollViewerScrollChanged(object sender, ScrollChangedEventArgs e)
    {
        if (e.ExtentHeightChange != 0 || e.ExtentWidthChange != 0)
        {
            Point? targetBefore = null;
            Point? targetNow = null;

            if (!lastMousePositionOnTarget.HasValue)
            {
                if (lastCenterPositionOnTarget.HasValue)
                {
                    var centerOfViewport = new Point(scrollViewer.ViewportWidth/2,
                                                     scrollViewer.ViewportHeight/2);
                    Point centerOfTargetNow =
                          scrollViewer.TranslatePoint(centerOfViewport, grid);

                    targetBefore = lastCenterPositionOnTarget;
                    targetNow = centerOfTargetNow;
                }
            }
            else
            {
                targetBefore = lastMousePositionOnTarget;
                targetNow = Mouse.GetPosition(grid);

                lastMousePositionOnTarget = null;
            }

            if (targetBefore.HasValue)
            {
                double dXInTargetPixels = targetNow.Value.X - targetBefore.Value.X;
                double dYInTargetPixels = targetNow.Value.Y - targetBefore.Value.Y;

                double multiplicatorX = e.ExtentWidth/grid.Width;
                double multiplicatorY = e.ExtentHeight/grid.Height;

                double newOffsetX = scrollViewer.HorizontalOffset -
                                    dXInTargetPixels*multiplicatorX;
                double newOffsetY = scrollViewer.VerticalOffset -
                                    dYInTargetPixels*multiplicatorY;

                if (double.IsNaN(newOffsetX) || double.IsNaN(newOffsetY))
                {
                    return;
                }

                scrollViewer.ScrollToHorizontalOffset(newOffsetX);
                scrollViewer.ScrollToVerticalOffset(newOffsetY);
            }
        }
    }
}
```

License

Written By

Kevin Stumpf

Germany Germany

This member has not yet provided a Biography. Assume it's interesting and varied, and probably something to do with programming.

Comments and Discussions

You must Sign in to use this message board.

Search Comments

Spacing Relaxed ⌄ Layout Normal ⌄ Per page 25 ⌄ Update

First Prev Next

how to use with image component?	**Wagner Elias 2021**	**31-Mar-22 19:45**
Excelent	**ALEX0621**	**9-Jul-16 1:01**
My vote of 5	**mkaze**	**8-Aug-15 23:43**
if consider ...	**Akcrios**	**5-May-15 16:37**
Thank you very much for you article!	**Akcrios**	**5-May-15 16:27**

Zoom on a click	**Shyamala_123**	**16-Feb-15 18:52**
My vote of 5	**amir_pro**	**3-Feb-15 8:45**
My vote of 5	**amir_pro**	**3-Feb-15 8:43**
Great work	**GPans**	**11-Oct-13 9:53**
My vote of 5	**Bijay Kant Salotry**	**19-Sep-13 6:52**
My vote of 5	**John Bracey**	**20-Jun-13 21:50**
My vote of 5	**Shahin Khorshidnia**	**11-Jun-13 21:19**
My vote of 5	**AdolfoPerez**	**6-Jun-13 4:27**
rotation	**redjzuzzj**	**4-Jun-13 15:22**
Splendid!	**Porgram Lover**	**24-Feb-13 11:34**
My vote of 5	**arturo1346**	**31-Oct-12 5:37**
My vote of 5	**Vivek Sharma 2**	**14-Jun-12 23:21**
My vote of 5	**njdnjdnjdnjdnjd**	**16-May-12 6:27**
My vote of 5	**Dezfoul**	**18-Apr-12 19:29**
Created some helper classes	**kgoulding**	**18-Jan-12 10:03**
Re: Created some helper classes	Member 9442681	1-Jul-13 22:24
My vote of 5	**Ubloobok**	**22-Oct-11 21:46**
My vote of 5	**Koss87**	**12-Jun-11 14:22**
Thanks for the Demo!	**(noor)**	**31-Mar-11 3:49**
Re: Thanks for the Demo!	Akcrios	5-May-15 16:17

Last Visit: 31-Dec-99 18:00   Last Update: 3-Apr-24 10:22   Refresh   1 2 Next ▷

General News Suggestion Question Bug Answer Joke Praise Rant Admin

Use Ctrl+Left/Right to switch messages, Ctrl+Up/Down to switch threads, Ctrl+Shift+Left/Right to switch pages.

Posted 29 Jul 2010