

原 一个简单的基于 DirectShow 的播放器 1（封装类）

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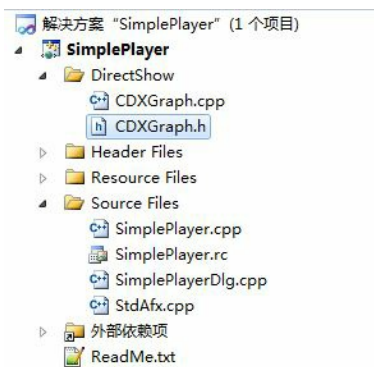
DirectShow最主要的功能就是播放视频，在这里介绍一个简单的基于DirectShow的播放器的例子，是用MFC做的，今后有机会可以基于该播放器开发更复杂的播放器软件。

注：该例子取自于《DirectShow开发指南》

首先看一眼最终结果，如图所示，播放器包含了：打开，播放，暂停，停止等功能。该图显示正在播放周杰伦的《听妈妈的话》。



迅速进入主题，看一看工程是由哪些文件组成的，如下图所示



从上图可以看出，该工程最重要的cpp文件有两个：SimplePlayerDlg.cpp和CDXGraph.cpp。前者是视频播放器对话框对应的类，而后者是对Direct Show功能进行封装的类。尤其是后面那个类，写的很好，可以说做到了“可复用”，可以移植到其他DirectShow项目中。

本文首先分析CDXGraph这个类，SimplePlayerDlg在下篇文章中再进行分析。

首先看看它的头文件：

CDXGraph.h

```

1.  /* 雷霄骅
2.   * 中国传媒大学/数字电视技术
3.   * leixiaohua1020@126.com
4.   *
5.   */
6.  // CDXGraph.h
7.
8.
9.  #ifndef __H_CDXGraph__
10. #define __H_CDXGraph__
11.
12.  // Filter graph notification to the specified window
13.  #define WM_GRAPHNOTIFY (WM_USER+20)
14.
15.  class CDXGraph
16.  {
17.  private:
18.      //各种DirectShow接口
19.      IGraphBuilder * mGraph;
20.      IMediaControl * mMediaControl;
21.      IMediaEventEx * mEvent;
22.      IBasicVideo * mBasicVideo;
23.      IBasicAudio * mBasicAudio;
24.      IVideoWindow * mVideoWindow;
25.      IMediaSeeking * mSeeking;
26.
27.      DWORD mObjectTableEntry;
28.
29.  public:
30.      CDXGraph();
31.      virtual ~CDXGraph();
32.
33.  public:
34.      //创建IGraphBuilder, 使用CoCreateInstance
35.      virtual bool Create(void);
36.      //释放
37.      virtual void Release(void);
38.      virtual bool Attach(IGraphBuilder * inGraphBuilder);
39.
40.      IGraphBuilder * GetGraph(void); // Not outstanding reference count
41.      IMediaEventEx * GetEventHandle(void);
42.
43.      bool ConnectFilters(IPin * inOutputPin, IPin * inInputPin, const AM_MEDIA_TYPE * inMediaType = 0);
44.      void DisconnectFilters(IPin * inOutputPin);
45.
46.      bool SetDisplayWindow(HWND inWindow);
47.      bool SetNotifyWindow(HWND inWindow);
48.      bool ResizeVideoWindow(long inLeft, long inTop, long inWidth, long inHeight);
49.      void HandleEvent(WPARAM inWParam, LPARAM inLParam);
50.      //各种操作
51.      bool Run(void); // Control filter graph
52.      bool Stop(void);
53.      bool Pause(void);
54.      bool IsRunning(void); // Filter graph status
55.      bool IsStopped(void);
56.      bool IsPaused(void);
57.
58.      bool SetFullScreen(BOOL inEnabled);
59.      bool GetFullScreen(void);
60.
61.      // IMediaSeeking
62.      bool GetCurrentPosition(double * outPosition);
63.      bool GetStopPosition(double * outPosition);
64.      bool SetCurrentPosition(double inPosition);
65.      bool SetStartStopPosition(double inStart, double inStop);
66.      bool GetDuration(double * outDuration);
67.      bool SetPlaybackRate(double inRate);
68.
69.      // Attention: range from -10000 to 0, and 0 is FULL_VOLUME.
70.      bool SetAudioVolume(long inVolume);
71.      long GetAudioVolume(void);
72.      // Attention: range from -10000(left) to 10000(right), and 0 is both.
73.      bool SetAudioBalance(long inBalance);
74.      long GetAudioBalance(void);
75.
76.      bool RenderFile(const char * inFile);
77.      bool SnapshotBitmap(const char * outFile);
78.
79.  private:
80.      void AddToOffsetTable(void);
81.      void RemoveFromOffsetTable(void);
82.      //各种QueryInterface, 初始各种接口
83.      bool QueryInterfaces(void);
84.  };
85.
86.  #endif // __H_CDXGraph__

```

该头文件定义了CDXGraph类封装的各种DirectShow接口, 以及提供的各种方法。在这里因为方法种类特别多, 所以只能选择最关键的方法进行分析。下面打开CDXGr

aph.cpp看看如下几个方法吧：

Create()：用于创建IGraphBuilder

```
[cpp]
1. //创建IGraphBuilder, 使用CoCreateInstance
2. bool CDXGraph::Create(void)
3. {
4.     if (!mGraph)
5.     {
6.         if (SUCCEEDED(CoCreateInstance(CLSID_FilterGraph, NULL, CLSCTX_INPROC_SERVER,
7.             IID_IGraphBuilder, (void **)&mGraph)))
8.         {
9.             AddToOffsetTable();
10.
11.             return QueryInterfaces();
12.         }
13.         mGraph = 0;
14.     }
15.     return false;
16. }
```

需要注意的是，Create()调用了QueryInterfaces()

QueryInterfaces()：用于初始化各种接口

```
[cpp]
1. //各种QueryInterface, 初始各种接口
2. bool CDXGraph::QueryInterfaces(void)
3. {
4.     if (mGraph)
5.     {
6.         HRESULT hr = NOERROR;
7.         hr |= mGraph->QueryInterface(IID_IMediaControl, (void **)&mMediaControl);
8.         hr |= mGraph->QueryInterface(IID_IMediaEventEx, (void **)&mEvent);
9.         hr |= mGraph->QueryInterface(IID_IBasicVideo, (void **)&mBasicVideo);
10.        hr |= mGraph->QueryInterface(IID_IBasicAudio, (void **)&mBasicAudio);
11.        hr |= mGraph->QueryInterface(IID_IVideoWindow, (void **)&mVideoWindow);
12.        hr |= mGraph->QueryInterface(IID_IMediaSeeking, (void **)&mSeeking);
13.        if (mSeeking)
14.        {
15.            mSeeking->SetTimeFormat(&TIME_FORMAT_MEDIA_TIME);
16.        }
17.        return SUCCEEDED(hr);
18.    }
19.    return false;
20. }
```

Release()：释放各种接口

```

1. //释放
2. void CDXGraph::Release(void)
3. {
4.     if (mSeeking)
5.     {
6.         mSeeking->Release();
7.         mSeeking = NULL;
8.     }
9.     if (mMediaControl)
10.    {
11.        mMediaControl->Release();
12.        mMediaControl = NULL;
13.    }
14.    if (mEvent)
15.    {
16.        mEvent->Release();
17.        mEvent = NULL;
18.    }
19.    if (mBasicVideo)
20.    {
21.        mBasicVideo->Release();
22.        mBasicVideo = NULL;
23.    }
24.    if (mBasicAudio)
25.    {
26.        mBasicAudio->Release();
27.        mBasicAudio = NULL;
28.    }
29.    if (mVideoWindow)
30.    {
31.        mVideoWindow->put_Visible(OAFALSE);
32.        mVideoWindow->put_MessageDrain((OAHWND)NULL);
33.        mVideoWindow->put_Owner(OAHWND(0));
34.        mVideoWindow->Release();
35.        mVideoWindow = NULL;
36.    }
37.    RemoveFromObjectTable();
38.    if (mGraph)
39.    {
40.        mGraph->Release();
41.        mGraph = NULL;
42.    }
43. }

```

Run() : 播放

```

1. bool CDXGraph::Run(void)
2. {
3.     if (mGraph && mMediaControl)
4.     {
5.         if (!IsRunning())
6.         {
7.             if (SUCCEEDED(mMediaControl->Run()))
8.             {
9.                 return true;
10.            }
11.        }
12.        else
13.        {
14.            return true;
15.        }
16.    }
17.    return false;
18. }

```

Stop() : 停止

```
[cpp]
1. bool CDXGraph::Stop(void)
2. {
3.     if (mGraph && mMediaControl)
4.     {
5.         if (!IsStopped())
6.         {
7.             if (SUCCEEDED(mMediaControl->Stop()))
8.             {
9.                 return true;
10.            }
11.        }
12.        else
13.        {
14.            return true;
15.        }
16.    }
17.    return false;
18. }
```

Pause() : 暂停

```
[cpp]
1. bool CDXGraph::Pause(void)
2. {
3.     if (mGraph && mMediaControl)
4.     {
5.         if (!IsPaused())
6.         {
7.             if (SUCCEEDED(mMediaControl->Pause()))
8.             {
9.                 return true;
10.            }
11.        }
12.        else
13.        {
14.            return true;
15.        }
16.    }
17.    return false;
18. }
```



SetFullScreen() : 设置全屏

```
[cpp]
1. bool CDXGraph::SetFullScreen(BOOL inEnabled)
2. {
3.     if (mVideoWindow)
4.     {
5.         HRESULT hr = mVideoWindow->put_FullScreenMode(inEnabled ? OATRUE : OAFALSE);
6.         return SUCCEEDED(hr);
7.     }
8.     return false;
9. }
```



GetDuration() : 获得视频时长

```
[cpp]
1. bool CDXGraph::GetDuration(double * outDuration)
2. {
3.     if (mSeeking)
4.     {
5.         __int64 length = 0;
6.         if (SUCCEEDED(mSeeking->GetDuration(&length)))
7.         {
8.             *outDuration = ((double)length) / 10000000.;
9.             return true;
10.        }
11.    }
12.    return false;
13. }
```

SetAudioVolume() : 设置音量

```
[cpp]    
1. bool CDXGraph::SetAudioVolume(long inVolume)  
2. {  
3.     if (mBasicAudio)  
4.     {  
5.         HRESULT hr = mBasicAudio->put_Volume(inVolume);  
6.         return SUCCEEDED(hr);  
7.     }  
8.     return false;  
9. }
```

RenderFile()：关键！

```
[cpp]    
1. bool CDXGraph::RenderFile(const char * inFile)  
2. {  
3.     if (mGraph)  
4.     {  
5.         WCHAR      szFilePath[MAX_PATH];  
6.         MultiByteToWideChar(CP_ACP, 0, inFile, -1, szFilePath, MAX_PATH);  
7.         if (SUCCEEDED(mGraph->RenderFile(szFilePath, NULL)))  
8.         {  
9.             return true;  
10.        }  
11.    }  
12.    return false;  
13. }
```

播放器源代码下载：<http://download.csdn.net/detail/leixiaohua1020/6453467>

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我的邮箱:liushidc@163.com