AVPro Windows Media

Unity Plugin

Fast playback of HD video and audio content.

1080p - AVI - H.264 - MP4 - WMV - DV and more.

Contents

1. Introduction

"AVPro Windows Media" is a plugin for Unity that allows playback of supported DirectShow content in a fast and easy manner.

The plugin is aimed at the high-end user group that require video playback features beyond Unity's built-in video support.

DirectShow is a trademark of Microsoft Inc., registered in the U.S. and other countries.

2. System Requirements

- Unity Pro 3.4 and above.
- The plugin only supports Microsoft Windows.
- Codecs for any video/audio you want to play.

When playing back high resolution videos a decent CPU and GPU must be available. Integrated chipsets may not handle HD content well, especially when using the DirectX rendering path. See the "Performance Notes" section below.

3. Features

a) Alpha / Transparency Support

The plugin supports video codecs that support an alpha channel, allowing playback of transparent videos - something that Unity's native Ogg Theora codec doesn't allow.

Codecs with alpha channel support include:

1. Lagarith (http://lags.leetcode.net/codec.html)
2. Uncompressed 32-bit AVI

b) Dynamic File Loading

The plugin supports loading files directly from the file system. This allows content to be replaced and updated without relying on having Unity installed. This is especially useful when creating an application that must be maintained/updated by a third party, or for live applications where content is being created while the application is running.

Another benefit of loading dynamically instead of importing into Unity is the time it takes to import assets. If you have a lot of video content, importing the assets can take a very long time. In this case, loading them dynamically provides a much better workflow.

c) Video Codec Choice

Video codecs can be chosen to suit the content and playback requirements. For example:

- <u>Lossless encoding</u> can be used for videos that require **high fidelity**. A good lossless codec is [Largarith](#).
- The [Largarith](#) codec can be used for videos with **tranparency**.
- <u>DV / Motion JPEG</u> or similar non-intra-frame codecs can be used when videos need to to **scrubbed through, played backwards or seeked quickly** (eg VJing).

d) Fast Playback of Full HD 1080p Content

The plugin has been optimised to run as fast as possible to allow for smooth playback of HD content. Various methods have been used to achieve optimal performance. These include:

- **Fast OpenGL Rendering Path**

  Using direct GPU hardware updates, the plugin is able to render very quickly using little CPU power. This path is only available when Unity is running in OpenGL mode.

  You can run your Unity editor in OpenGL mode by adding the "-force-opengl" switch to the shortcut. Builds can also be forced to run in OpenGL mode by using the "-force-opengl" switch on the generated executable files.

- **Fast DirectX Rendering Path**

  The DirectX rendering path isn't as fast as the OpenGL path however we have made it as fast as possible using various techniques. Power-of-2 sized textures are used for texture updates as Unity updates these much quicker.

  Note: using the DirectX path a 1280x720 video will use use a 2048x1024 texture, as will a 1920x1080 video, so there is often not much difference between them in terms of system load.

- **Timely Video Updates**

  Videos are only updated when a new video frame is ready instead of every frame.

- **Native Pixel Formats**

  The plugin can use RGBA or the native YUV pixel format for GPU texture uploads. Using the YUV format we can decrease the video frame size by half. Conversion from native pixel formats to standard RGBA is done on the GPU via a shader.

f) Unity Integration

The "AVPro Windows Media" plugin provides an API for playing DirectShow content. Addionally some helpful Unity components have been created to allow drag and drop use of the plugin without any scripting. See the "Usage" section below.

Movies are uploaded on to standard Unity Texture2D objects.

g) Other

- Play multiple DirectShow videos simultaneously.
- Audio volume control.
- Seeking.
- Playback rate control.

4. Installation

Import the unitypackage file into your Unity project.

You may need to move the "Plugins" folder into the root of your project.

Ensure you have the relevant codecs installed for the content you want to play.

5. Usage

FullScreenMovie.cs

This component can be added to any Unity object and will playback DirectShow content fullscreen matching the source content aspect ratio. It inherits from MoviePlayer.

ScreenMovie.cs

This component worked like a GUITexture and allows a movie to be positioned anywhere on the screen. It inherits from MoviePlayer.

MeshMovieApply.cs

This component can be added to any Unity mesh object and allows DirectShow content to override textures on the mesh.

MoviePlayer.cs

This script can be used as a starting point for creating your own playback scripts. FullScreenMovie.cs inherits this script.

AVProWindowsMedia.cs

This script exposes the core functionality of the plugin. Using this script and the others as reference you will be able to craft your own media playback scripts.

6. Performance Notes

The following performance notes all relate to playback of the highest resolution (1080p) HD

content.

Here we demonstrate that the plugin has high performance and show how different configurations affect the performance. One thing we can't really demonstrate here is playback smoothness. This is something that the developer will have to test for themselves, however we've found that our plugin plays back 1080p HD movies smoother than Unity's built-in movie playback system. In generate though our plugin does use slightly more CPU power doing so.

Test Hardware:

- Windows 7 Professional 64-bit
- Intel Core i5 750 @ 2.67Ghz
- 8GB RAM
- NVIDIA Gefroce GTX 275 896MB (Driver version 285.62)

Sample.MP4 H264 1920x1080. Score is frames per second out of 60.

Config	Machine FPS
DirectX RGBA	17
DirectX Native YUV	35
OpenGL RGBA	60
OpenGL Native YUV	60

Note: When using 1080p videos it's actually best if your input video has a maximum height of <= 1024 as this means the plugin can use a texture with a height of maximum 1024 instead of 2048 in the case of true 1080p.

7.0 FAQ (Frequently Asked Questions)

1. **What codecs are needed to play MP4/MKV files?**

   Install Haali Media Splitter (http://haali.su/mkv/)

2. **How do I fix the error: "DLLNotFoundException"?**

   You need to move/copy the "Plugins" folder from your "AVProWindowsMedia" folder into the root of your folder structure. This means the "Plugins" folder should be moved to your "Assets" folder. Unfortunately this is a limitation in the way Unitys Asset Store handles plugins.

8. Version History

Version 1.35 - Saturday, 10 March 2012
- Fixed a thread leak in source filter.
- Fixed an audio handle leak.

Version 1.3 - Friday 17 February 2012
- Fixed a memory leak in RenderTexture.

- Improved API for programatically loading videos.
- Fixed blank video frame from appearing.
- Switching between videos of the same dimensions is now faster.

Version 1.2 - Wednesday 11 January 2012
- Added playback rate control, including reverse.
- Added audio balance control.

Version 1.0 - Thursday 22 December 2011
- Initial release submitted to Asset Store.

9. Support

If you are in need of support or have any comments/suggestions regarding this product please contact us.

Website: http://www.renderheads.com/contact/
Email: contact@renderheads.com

If you are reporting a bug please include any relevant files so that we may remedy the problem as fast as possible.