SAMPLE

Transcode with video quality improvement

1 Introduction

This sample demonstrates how to build the transcode pipeline using AMD's hardware-accelerated Media Foundation Transforms (MFTs). This sample also demonstrates how to use AMD's video quality filter to enhance the video quality in the transcode pipeline.

2 Using the sample

2.1 Location

`$<installDirectory>\samples\mediaFoundation\transcodeVq\`

2.2 Contents

Package contents

Folder: `$<installDirectory>\samples\mediaFoundation\transcodeVq\src\`

File name	Description
`TranscodeVqMain.cpp`	Transcode main
`TranscodeVqSession.cpp`	Contains transcode session class and functions for building transcode pipeline
`TranscodeVqConfig.cpp`	Contains functions for configuration parsing

Folder:
`$<installDirectory>\samples\mediaFoundation\transcodeVq\inc\`

File name	Description
`TranscodeVqApi.h`	Header file for transcode API
`TranscodeVqConfig.h`	Header file which contains transcode configuration function definition
`TranscodeVqSession.h`	Header file for transcode session class

Folder:
`$<installDirectory>\samples\mediaFoundation\transcodeVq\config\`

File name	Description
`exampleConfig.cfg`	Configuration file for encoder and video quality parameters

Folder:
`$<installDirectory>\samples\mediaFoundation\transcodeVq\docs\`

File name	Description
`MediaSDK_MFT_transcodeVq.pdf`	Sample documentation

Folder:
`$<installDirectory>\samples\mediaFoundation\transcodeVq\build\windows\`

File name	Description
`transcodeVqVs10.sln`	Visual Studio 10 solution file
`transcodeVqVs10.vcxproj`	Visual Studio 10 project file
`transcodeVqVs10.vcxproj.filters`	Visual Studio 10 project filter file
`transcodeVqVs12.sln`	Visual Studio 12 project solution file
`transcodeVqVs12.vcxproj`	Visual Studio 12 project file
`transcodeVqVs12.vcxproj.filters`	Visual Studio 12 project filter file

2.3 Parameters

Encoder-specific configuration parameters

Parameter name	Default value	Supported range	Remarks
`encGOPSize`	20		Max number of frames in a GOP (0=auto)
`encMeanBitrate`	3000000		Bitrate of encoded video (bits per second)
`encMaxBitrate`	4000000		Maximum bitrate of encoded video (used only for VBR) in bits per second
`encBufferSize`	2000000		VBR buffer size
`encNumBFrames`	1	0 - 3	Specifies the number of B frames to be inserted
`encCompressionStandard`	77	For supported values, see http://msdn.microsoft.com/en-us/library/windows/desktop/dd318776(v=vs.85).aspx	Compression standard
`encRateControlMethod`	1	`eAVEncCommonRateControlMode_CBR = 0, eAVEncCommonRateControlMode_PeakConstrainedVBR = 1, eAVEncCommonRateControlMode_UnconstrainedVBR = 2, eAVEncCommonRateControlMode_Quality = 3`	For more details, see http://msdn.microsoft.com/en-us/library/windows/desktop/dd388772(v=vs.85).aspx
`encLowLatencyMode`	0	`1 - True` `0 - False`	Specifies whether the output stream should be structured so that the encoded stream has a low decoding latency.

Parameter name	Default value	Supported range	Remarks
encQualityVsSpeed	60	0 - Low quality faster encoding 100 - Higher quality, slower encoding	
encCommonQuality	50	0 to 100 0 - low quality 100 - highest quality	This parameter is used only when encRateControlMethod is set to eAVEncCommonRateControlMode_Quality. in this mode the encoder selects the bit rate to match the quality settings.

Video quality configuration parameters

Parameter name	Default value	Supported range	Remarks
vqEnableSteadyVideo	0	enables=1 / disables=0	Enables image stabilization
vqSteadyVideoStrength	1	min=0 max=3	Strength of image stabilization
vqSteadyVideoZoom	95	min=90 max=100	
vqSteadyVideoDelay	0	min=0 max=6	
vqDeinterlacing	0	AMF_EFFECT_DEINTERLACING_AUTOMATIC 0 AMF_EFFECT_DEINTERLACING_WEAVE 1 AMF_EFFECT_DEINTERLACING_BOBE 2 AMF_EFFECT_DEINTERLACING_ADAPTIVE 3 AMF_EFFECT_DEINTERLACING_MOTION_ADAPTIVE 4 AMF_EFFECT_DEINTERLACING_VECTOR_ADAPTIVE 5	De-interlacing algorithm
vqDeinterlacingPullDownDetection	0	enables=1 / disables=0	
vqEnableEdgeEnhancement	0	enables=1 / disables=0	Edge enhancement
vqEdgeEnhacementStrength	50	min=1 max=100	Strength of edge enhancement
vqEnableDenoise	0	enables=1 / disables=0	Enable Denoise filter
vqDenoiseStrength	50	min=1 max=100	Denoise strength
vqEnableMosquitoNoise	0	enables=1 / disables=0	Enable Mosquito noise
vqMosquitoNoiseStrength	64	min=0 max=100	Mosquito noise removal strength
vqEnableDeblocking	0	enables=1 / disables=0	Enable de-blocking
vqDeblockingStrength	50	min=0 max=100	Strength of de-blocking

Parameter name	Default value	Supported range	Remarks
vqEnableDynamicContrast	1	enables=1 / disables=0	Enables dynamic contrast
vqEnableColorVibrance	0	enables=1 / disables=0	Enables color vibrance
vqColorVibranceStrength	0	min=0 max=100	Strength of color vibrance filter
vqEnableSkintoneCorrection	0	enables=1 / disables=0	Enables skin tone correction
vqSkintoneCorrectionStrength	50	min=0 max=100	Skin tone correction strength
vqEnableBrighterWhites	0	enables=1 / disables=0	Enhances the whiter portion of the image
vqEnableGammaCorrection	0	enables=1 / disables=0	Gamma Correction filter
vqGammaCorrectionStrength	1000	min=500 max=2500	Gamma correction strength
vqBrightnessEffect	100	min=0 max=200	Brightness
vqContrastEffect	1000	min=0 max=2000	Contrast
vqSaturationEffect	1000	min=0 max=2000	Saturation
vqTintEffect	30000	min=0 max=60000	Tint effect
vqEnableFalseContourReduction	0	enables=1 / disables=0	Reduces the false contour
vqFalseContourReductionStrength	50	min=0 max=100	False contour reduction strength
vqDemoMode	0	enables=1 / disables=0	Applies VQ settings to only the vertical half of the video frame/image

Common configuration parameters

Parameter name	Default value	Supported range	Remarks
useSWCodec	0	Enable=1 Disable=0	Enables/Disables the use of software Encoder and Decoder. If set to 0, hardware-based codecs are used to encode and decode the stream; otherwise software-based codecs are used.

2.4 Compile

1. Ensure that the following tools and SDKs are present:
   - Microsoft Visual Studio 2010 or 2012
     If Windows Software Development Kit (SDK) is not installed, install it from http://msdn.microsoft.com/en-us/library/windows/desktop/hh852363.aspx.
2. Open one of the following solution files:
   `$<installDirectory>\samples\mediaFoundation\transcodeVq\build\windows\transcodeVqVs12.sln`
   `$<installDirectory>\samples\mediaFoundation\transcodeVq\build\windows\transcodeVqVs10.sln`
3. Build the sample:

- Open the `transcodeVqVs10.sln` solution file with Microsoft Visual Studio 2010 Professional Edition or the `transcodeVqVs12.sln` solution file with Microsoft Visual Studio 2012 Professional Edition.
- To build all the solutions, select `Build > Build Solution`.
- Select the project file in the Solutions Explorer.
  The executable `transcodeVq.exe` is created in the following folders for 32-bit builds and 64-bit builds:
  `$<installDirectory>\samples\mediaFoundation\transcodeVq\bin\x86\`
  `$<installDirectory>\samples\mediaFoundation\transcodeVq\bin\x86_64\`
  Depending on the build (i.e. 32-bit or 64-bit), the post build step copies the appropriate Video Quality (VQ) MFT `.dll` file from the `$<installDirectory>\dll\videoQualityMFT\windowsClassicDesktop\` folder into the relevant `\bin\` directory.

3 Run

The sample can be executed on an AMD platform that includes the VCE and UVD hardware blocks.

On the command prompt, change to the directory that contains the executable, and execute the following command:
`transcodeVq.exe -i <input.avi> -o <output.asf> -c <configfile> -l <0, 1, or 2 >`

-l enables the logging. Setting "0" means no logging. "1" generates the log at the API level. "2" generates logs at the transcoding session level.

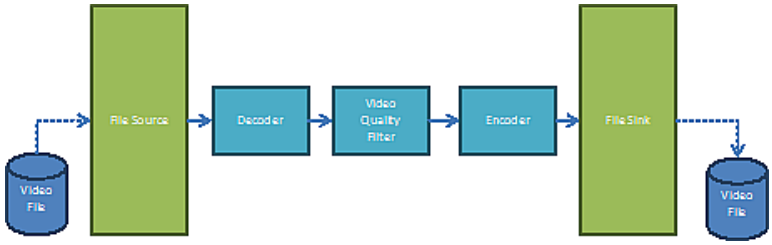
The `$<installDirectory>\inc\ErrorCodes.h` file contains information about the error codes. You can also print the Microsoft error codes by using the `getMicrosoftErrorCode()` API, as shown in `TranscodeVqMain.cpp`. The Microsoft error codes can be understood from the `Mferror.h` file that Microsoft provides as part of its Windows kits.

The configuration file associated with this sample is located in the following folder:
`$<installDirectory>\samples\mediaFoundation\transcodeVq\config\`

`Output.asf` contains the H264 encoded stream with video quality improvements.

4 Implementation Details

The sample implements the following transcode pipeline:



Note: The Video Quality filter is supported on only the Southern Islands (SI) and later GPU families. If a different platform/family is used, then the output of the decoder is directly connected to the renderer, bypassing the Video Quality filter.

5 Supported formats

The following file formats are supported:

- Input file/container formats: .avi, .mp4, .wmv
- Video decoders supported: H264, MPEG4 part II, VC1
- Output file/container format .asf
- Video encoder supported: H264

6 Known limitations

The sample is currently supported on the following platforms:

- Windows 7 (DirectX 9)
- Windows 8/8.1 (DirectX 9 and DirectX 11)

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