Video Processing (VPP) Sample

Overview

VPP Sample works with **Intel® Media Server Studio 2017 for Linux**.

It demonstrates how to use the **Intel® Media Server Studio – SDK** (hereinafter referred to as "**SDK**") API to create a simple console application that performs video processing of raw video sequences.

Features

VPP Sample supports the following video formats:

Format type	
input (uncompressed)	YV12, NV12, YUY2, RGB4 (RGB 32-bit)
output (uncompressed)	NV12, YUY2, RGB4, YV12

Hardware Requirements

See `<install-folder>\Media Samples Guide.pdf`.

Software Requirements

See `<install-folder>\Media Samples Guide.pdf`.

How to Build the Application

See `<install-folder>\Media Samples Guide.pdf`.

Running the Software

See `<install-folder>\Media Samples Guide.pdf`.

The executable file requires the following command-line switches to function properly:

-lib type	type of used library: sw, hw (default: sw)
-d3d	use d3d9 surfaces
-d3d11	use d3d11 surfaces
-plugin_guid GUID	use VPP plug-in with specified GUID
-p GUID	use VPP plug-in with specified GUID
-extapi	use RunFrameVPPAsyncEx instead of RunFrameVPPAsync. Need for PTIR.
-gpu_copy	Specify GPU copy mode. This option triggers using of InitEX instead of Init.

-sw width	width of src video (def: 352)
-sh height	height of src video (def: 288)
-scrX x	cropX of src video (def: 0)
-scrY y	cropY of src video (def: 0)
-scrW w	cropW of src video (def: width)
-scrH h	cropH of src video (def: height)
-sf frameRate	frame rate of src video (def: 30.0)
-scc format	format (FourCC) of src video (def: nv12. support nv12|yv12|yuy2|rgb3|rgb4|imc3|yuv400|yuv411|yuv422h|yuv422v|yuv444|uyvy)
-sbitshift 0|1	shift data to right or keep it the same way as in Microsoft's P010
-sbitdepthluma value	shift luma channel to right to "16 - value" bytes
-sbitdepthchroma value	shift chroma channel to right to "16 - value" bytes
-spic value	picture structure of src video: • -1 - unknown • 0 - interlaced top field first • 1 - progressive (default) • 2 - interlaced bottom field first
-dw width	width of dst video (def: 352)
-dh height	height of dst video (def: 288)
-dcrX x	cropX of dst video (def: 0)
-dcrY y	cropY of dst video (def: 0)
-dcrW w	cropW of dst video (def: width)
-dcrH h	cropH of dst video (def: height)
-df frameRate	frame rate of dst video (def: 30.0)
-dcc format	format (FourCC) of dst video (def: nv12. support nv12|yuy2|rgb4|yv12)
-dbitshift 0|1	shift data to right or keep it the same way as in Microsoft's P010
-dbitdepthluma value	shift luma channel to left to "16 - value" bytes
-dbitdepthchroma value	shift chroma channel to left to "16 - value" bytes
-dpic value	picture structure of dst video: • -1 - unknown • 0 - interlaced top field first • 1 - progressive (default) • 2 - interlaced bottom field first

-composite <ParametersFile>	Composition of several input files in one output. The location of substreams on the primary stream is described in the parameter file. The syntax of the parameters file is:
	`primarystream=<video file name>`
	`width=<input video width>`
	`height=<input video height>`
	`cropx=<input cropX (def: 0)>`

	cropy=<input cropY (def: 0)> cropw=<input cropW (def: width)> croph=<input cropH (def: height)> framerate=<input frame rate (def: 30.0)> fourcc=<format (FourCC) of input video (def: nv12. support nv12|yuy2)> picstruct=<picture structure of input video, 0 = interlaced top field first 2 = interlaced bottom field first 1 = progressive (default)> dstx=<X coordinate of input video located in the output (def: 0)> dsty=<Y coordinate of input video located in the output (def: 0)> dstw=<width of input video located in the output (def: width)> dsth=<height of input video located in the output (def: height)> stream=<video file name> width=<input video width> ... The parameters file may contain one primary stream (which goes first) and up to 64 substreams.
-di_mode (mode)	set type of deinterlace algorithm 8 - reverse telecine for a selected telecine pattern (use -tc_pattern). For PTIR plug-in 2 - advanced or motion adaptive (default) 1 - simple or BOB
-deinterlace (type)	enable deinterlace algorithm (alternative way: -spic 0 -dpic 1) type is tff (default) or bff
-rotate (angle)	enable rotation. Supported angles: 0, 90, 180, 270.
-scaling_mode (mode)	specify type of scaling to be used for resize.
-denoise (level)	enable denoise algorithm. Level is optional range of noise level is [0, 100]
-detail (level)	enable detail enhancement algorithm. Level is optional range of detail level is [0, 100]
-pa_hue hue	procamp hue property. range [-180.0, 180.0] (def: 0.0)
-pa_sat saturation	procamp satursation property. range [0.0, 10.0] (def: 1.0)
-pa_con contrast	procamp contrast property. range [0.0, 10.0] (def: 1.0)
-pa_bri brightness	procamp brightness property. range [-100.0, 100.0] (def: 0.0)
-gamut:compression	enable gamut compression algorithm (xvYCC->sRGB)
-gamut:bt709	enable BT.709 matrix transform (RGB->YUV conversion)(def: BT.601)
-frc:advanced	enable advanced FRC algorithm (based on PTS)
-frc:interp	enable FRC based on frame interpolation algorithm
-tcc:red	enable color saturation algorithm (R component)
-tcc:green	enable color saturation algorithm (G component)
-tcc:blue	enable color saturation algorithm (B component)
-tcc:cyan	enable color saturation algorithm (C component)
-tcc:magenta	enable color saturation algorithm (M component)
-tcc:yellow	enable color saturation algorithm (Y component)
-ace	enable auto contrast enhancement algorithm

-ste (level)	enable Skin Tone Enhancement algorithm. Level is optional range of ste level is [0, 9] (def: 4)
-istab (mode)	enable Image Stabilization algorithm. Mode is optional mode of istab can be [1, 2] (def: 2) where: 1 means upscale mode, 2 means croppping mode
-view:count value	enable Multi View preprocessing. range of views [1, 1024] (def: 1)
-svc id width height	enable Scalable Video Processing mode id-layerId, width/height-resolution
-ssitm (id)	specify YUV<->RGB transfer matrix for input surface.
-dsitm (id)	specify YUV<->RGB transfer matrix for output surface.
-ssinr (id)	specify YUV nominal range for input surface.
-dsinr (id)	specify YUV nominal range for output surface.
-mirror (mode)	mirror image using specified mode.
-n frames	number of frames to VPP process
-iopattern IN/OUT surface type	IN/OUT surface type: sys_to_sys, sys_to_d3d, d3d_to_sys, d3d_to_d3d (def: sys_to_sys)
-async n	maximum number of asynchronious tasks. def: -async 1
-perf_opt n m	n: number of prefetech frames. m : number of passes. In performance mode app preallocates bufer and load first n frames, def: no performace 1
-pts_check	checking of time stampls. Default is OFF
-pts_jump	checking of time stamps jumps. Jump for random value since 13-th frame. Also, you can change input frame rate (via pts). Default frame_rate = sf
-pts_fr	input frame rate which used for pts. Default frame_rate = sf
-pts_advanced	enable FRC checking mode based on PTS
-pf file for performance data	file to save performance data. Default is off
-roi_check mode seed1 seed2	checking of ROI processing. Default is OFF mode - usage model of cropping var_to_fix - variable input ROI and fixed output ROI fix_to_var - fixed input ROI and variable output ROI var_to_var - variable input ROI and variable output ROI seed1 - seed for init of rand generator for src seed2 - seed for init of rand generator for dst range of seed [1, 65535]. 0 reserved for random init
-tc_pattern (pattern)	set telecine pattern 4 - provide a position inside a sequence of 5 frames where the artifacts starts. Use to -tc_pos to provide position 3 - 4:1 pattern 2 - frame repeat pattern 1 - 2:3:3:2 pattern 0 - 3:2 pattern
-tc_pos (position)	Position inside a telecine sequence of 5 frames where the artifacts starts - Value [0 - 4]
-reset_start (frame number)	after reaching this frame, encoder will be reset with new parameters, followed after this command and before -reset_end
-reset_end	specifies end of reset related options

Below are examples of a command-line to execute **VPP Sample**:

```
$ sample_vpp -sw 352 -sh 144 -scc yv12 -dw 320 -dh 240 -dcc nv12
-nr 0 -i input.yv12 -o output.nv12
```

```
$ sample_vpp -lib hw -scc nv12 -dcc nv12 -composite
```

```
parameters.par -o out.yuv

The example of parameters.par:
primarystream=input_720x480.yuv
width=720
height=480
cropx=0
cropy=0
cropw=720
croph=480
dstx=0
dsty=0
dstw=720
dsth=480
stream=input_480x320.yuv
width=480
height=320
cropx=0
cropy=0
cropw=480
croph=320
dstx=100
dsty=100
dstw=320
dsth=240
```

Please, also pay attention on “Running the Software” section of `<installfolder>/Media Samples Guide.pdf` document where you will find important notes on backend specific usage (drm and x11).

Known Limitations

- Streams composition works only on the Intel® Xeon® processor E3-1200 v3 product family with hardware **SDK** library.
- Output cropping may be ignored in streams composition for now.

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