Advanced Micro Devices

Advanced Media Framework – Pre-Processing Component

Programming Guide

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1 Introduction

1.1 Scope

This document describes the Pre-Processing component of the AMD Advanced Media Framework (AMF). Full documentation on AMF can be found at https://gpuopen.com/gaming-product/advanced-media-framework/.

1.2 Overview

The AMF Pre-Processing component is intended to run before the HW encoder aiming at improving its coding efficiency. The AMF Pre-Processing component is instantiated as a separate AMF component. It takes in raw NV12 video surfaces and outputs the processed NV12 video images, which can be passed to a downstream component (Pre-Analysis or encoder).

1.3 Supported Hardware

The AMF Pre-Processing component is supported by Radeon RX 5000 Series or newer GPUs as well as Ryzen 2000 U/H series or newer APUs.

1.4 Disclaimer

The current AMF Pre-Processing component is in its beta release. Existing features may get optimized over time, and new features may also be added in future releases.

2 AMF Pre-Processing

In the current release, the Pre-Processing component includes a JND based edge-adaptive denoising filter that helps the encoder to achieve better coding efficiency. This filter aims at removing bit-expensive high frequency details that are deemed not important for the human visual system. There are two controls for this filter: strength and sensitivity. "Strength" controls the filtering strength (how much picture details will be removed), while "sensitivity" controls the edge detection sensitivity (what regions will be filtered, as regions detected as edges will not be filtered).

The AMF Pre-processing component runs on DX11 and OpenCL kernels. Since the Pre-Processing filter in the AMF Pre-Processing component currently accepts the NV12 format, the AMF Converter can be used to convert images to the compatible NV12 format before being submitted into to the Pre-Processing component.

2.1 Input / Output Format

The AMF Pre-Processing component accepts the NV12 format as input and outputs the processed images in NV12 format as well.

2.2 Properties

Table 1 provides the detailed description of the available parameters for AMF Pre-Processing.

Name	Type
AMF_PP_ENGINE_TYPE	AMF_MEMORY_TYPE
AMF_PP_ADAPTIVE_FILTER_STRENGTH	amf_int64
AMF_PP_ADAPTIVE_FILTER_SENSITIVITY	amf_int64

Table 2. AMF PA properties in standalone mode

Name: `AMF_PP_ENGINE_TYPE`

Values: `AMF_MEMORY_HOST`, `AMF_MEMORY_DX11`, `AMF_MEMORY_OPENCL`

Default Value: `AMF_MEMORY_OPENCL`

Description: Determines what type of kernels the pre-processor uses.

Name: `AMF_PP_ADAPTIVE_FILTER_STRENGTH`

Values: `0` - `10`

Default Value: `4`

Description: Strength of the pre-processing filter. The higher the strength, the stronger the filtering.

Name: `AMF_PP_ADAPTIVE_FILTER_SENSITIVITY`

Values: `0` - `10`

Default Value: `6`

Description: Sensitivity to edges. The higher the value, the more likely edges will be detected, and hence the less likely filtering will occur.

2.3 Sample Application

The TranscodeHW sample application in the SDK package can be used to illustrate how to enable the AMF Pre-Processing filter. When the Pre-Processing filter is enabled using

```
-EnablePreEncoderFilter true
```

TranscodeHW will filter the decoded raw images before submitting them to the encoder. Below is an example cmd line enabling the Pre-Processing filter:

```
TranscodeHW.exe -input input.mp4  -output output.mp4 -width 1920 -height 1080 -usage transcoding -qualitypreset quality
-targetBitrate 5000000 -frames 1000 -engine dx11 -EnablePreEncodeFilter true -PPEngineType opencl -
PPAdaptiveFilterStrength 4 -PPAdaptiveFilterSensitivity 6
```

4 Annex A: Glossary of Acronyms

Acronym	Definition
AMF	Advanced Media Framework
PP	Pre-Processing
PA	Pre-Analysis