Transcoding System

Transcoding System is a way of converting still frames into movie and converting a movie into image sequences that can be played back on a large screen or projector (and/or directly on artist's workstations) for the purposes of doing a review or just seeing the resulting work in motion.

We are focusing on below Points to deploy in our Transcoding System for initial stage.

1. Image Sequence to Movie Conversion and vice versa. (with different codec, FPS and File Formats)
2. Image and Video File Format Conversion (i.e. DPX to TGA) and Transformation(Scale, Rotation, Crop).
3. Image, Video and Audio manipulation, like a Editing Software where we can merge multiple medias.

There are several libraries available which provide methods and modules for Media (Audio/Video/Image) Transcode System. We have done some research on few libraries. Below is a brief description of libraries with their Pros and Cons.

Also, I have attached a Comparing Table of libraries. (Check PNG Images in attachments.)

1. FFMPEG :

FFmpeg is the multimedia framework, able to decode, encode, transcode, mux, demux, stream, filter and play pretty much any kind of Media.

It supports the most of formats up to the cutting edge. It contains libavcodec, libavutil, libavformat, libavfilter, libavdevice, libswscale and libswresample which can be used by applications.

Also ffmpeg, ffserver, ffplay and ffprobe which can be used by end users for transcoding, streaming and playing.

Pros :

1. It's been used by a large group of user across the world.
2. For video/audio transcoding it's the best library available which is open source and free for commercial use(Licensed under LGPL).
3. Blender is also using support of FFMpeg.
4. Among the more common formats ffmpeg can handle h.264, HEVC(h.265), mp3, AAC, mpeg-4, wmv3, AppleProRes, QuickTime, SWF, Speex, FLAC, VP9 and many more.

Cons :

1. In Image Processing, it will compress the quality of Image. Sometime it renders image with some Artifacts or with glitches.
2. As it doesn't support Image Processing with High Quality still we can use is for few internal image conversion but for Client delivery definitely not.
3. OpenEXR is not very well supported in ffmpeg (despite there being claims of OpenEXR support) and SXR is definitely not supported. This means that the first part of the workflow must be a file conversion from EXR to either DPX or TIFF or TGA (or lossless JPEG).

2. OpenImageIO :

OpenImageIO is a library for Image Processing, and a bunch of related classes, utilities, and applications. OpenImageIO is used extensively in animation and VFX studios all over the world.

Pros :

1. It's the best library available for Image Processing.
2. We Can
    a. convert image files from one format to another.
    b. Compare two images, print information on how much they differ
    c. Fetch basic (width and height of the image and its color depth) or detailed (metadata) information about the given image.
    d. Searches images for matching metadata.
3. This library supports the OpenEXR, DPX, HDR/RGBE, TIFF, JPEG/JFIF, PNG, Truevision TGA, BMP, ICO, FITS, RMan Zfile, Softimage PIC and many more.

Cons :

1. It doesn't support any Video/Audio conversion.

3. Avisynth :

AviSynth is a powerful tool for video post-production. It provides ways of editing and processing videos. AviSynth works as a frameserver. AviSynth itself does not provide a graphical user interface (GUI), but instead relies on a script system that allows advanced non-linear editing. It also provides numbers of plugin which allows many advance media formats.

Pros :

1. It can be used to combining, stacking or merging multiple videos/audio.(Kinda Editing Software)
2. This allows to Color conversion and adjustment filters on video. (Blur, Sharpen, GrayScale, ChangeColorSpace)

Cons :

1. Implementing this as a Templatable(Global), is not so handy.
2. Avisynth only supports 8-bit video but using some 3rd Party plugin it can support High End Video but the quality of output may not be the same.

4. OpenCV :

OpenCV (Open Source Computer Vision) is a library of programming functions mainly aimed at real-time computer vision. It is usful for Image Processing. We can apply different geometric transformations to images like rotation, translation etc.

Pros :

1. Currently OpenCV supports a wide variety of programming languages like C++, Python, Java etc and is available on different platforms including Windows, Linux, OS X, Android, iOS etc.

2. Also, interface is based on CUDA and OpenCL are also under active development for high-speed GPU operations.

Cons :

1. None Video Processing Supported.