Chapter 9a - Video Filters

This chapter is broken into two parts. Part A covers the Blur and Adaptive Noise Reduction Filter. Part B covers Deinterlace, Gamma, and Talking Heads Filter.

Video filters modify the visual component of your movie. The video filters Movie Cleaner provides are primarily aimed at improving compression, either through noise reduction or through static zone definition.

Blur

The blur filter works to minimize subtle difference from frame to frame. By blurring the entire image in a series of frames just a tiny bit, the filter can eliminate the need to save very small changes that are not important to the overall quality of the video. Therefore, you often get better compressed video image quality by blurring the image first.

There are three levels of blur: mild, medium, and extreme. Generally, for 320 x 240 movies mild or medium blurs are useful. For larger movies, extreme blurs may be more appropriate. Experiment to find the right setting for your particular movie and settings.

Movie Cleaner uses a Gaussian blur, which is "center weighted." Generally, center weighted blurs give a smoother image than "even weighted" blurs (such as a mean.)

Adaptive noise reduction

How it works:
Movie Cleaner Pro offers an adaptive noise reduction filter which selectively smoothes out "flat field" noise ("blotchy" areas), as well as removes "stray pixels." You may select one of

several pre-configured settings or manually select the parameters for the noise reduction.

The adaptive noise reduction filter analyzes each pixel relative to the surrounding pixels. Depending on how various parameters are set, Movie Cleaner Pro decides if the pixel is normal, "flat field" noise, or a "stray pixel".

If the pixel is deemed to be normal, it is left alone.

If the pixel is "flat field" noise, it is replaced with an average (mean) of the surrounding pixels. This "smoothes out" irregular areas and makes them compress better. "Flat field" noise is found in areas that should be uniform (like the background behind titles) but instead have minor irregularities.

If the pixel is a "stray pixel," it is replaced with a "most typical" (median) surrounding pixel. This effectively removes the "fine grain" noise that often comes from VHS source, under-lit subjects, poor duplication, etc.

Why use it: Noise is the #1 enemy of compression - remove the noise and your video compresses much better. Movie Cleaner Pro now allows you to selectively identify and remove just the noise from your video source without noticeably blurring the rest of the image.

What is unique about this filter is that it doesn't apply the same filter to every pixel - different filters are applied only to identified "problem" pixels, and the "normal" pixels are left unaltered. Thus, the noise is removed but the overall image is not degraded, so you get better looking compressed movies.

How to use adaptive noise reduction

Select an option from the pop-up menu at the top of the Noise Reduction sub-section of the Video section. Your options are:

None: Leaves noise reduction off.

Flat areas:
Looks for pixels that are similar but, not identical, to the surrounding areas, and makes them as identical as possible. This is useful for areas that are "blotchy" but should be smooth, such as the background of titles, flat backdrops, etc. This minimizes detail that is significant to the compressor, but not to human eyes, so your image compresses better without noticeable image degradation. Leaves "stray pixels" alone.

Stray pixels: Looks for single pixels that are significantly different than those surrounding them and replaces these stray pixels with a median of the surrounding pixels. "Flat field" noise ("blotchy") areas are left alone. Very fine detail, such as highlights in eyes, etc., may be lost.

Flat & Stray: Uses both the "stray pixel" and "flat field" noise reduction options above. This is a good setting for video sources that suffer from both kinds of noise.

Custom:
Allows you to manually specify what percentage difference between the center pixel and the surrounding pixels defines each type of noise. See the following section for more details

on how to set the "Custom" option.

More details on using the "Custom" setting of the adaptive noise filter

In order to manually set this filter effectively, a basic understanding of what the various filters are doing is useful.

The adaptive noise reduction filter looks at each pixel in your image, and compares it to the surrounding pixels. The "flat field" option looks for very small differences between pixels and their surroundings. The "stray pixels" option looks for large differences between single pixels and their surroundings. Anything that doesn't fall into the "stray pixels" or "flat field" noise category is considered normal and left alone.

The following diagrams help illustrate how the filter identifies and deals with various types of pixels. The center pixel is the one being analyzed relative to the 8 pixels surrounding it.

Normal pixels

he center pixel is compared to the surrounding pixels and found to be

within an acceptable difference - it is similar enough not to be a stray, and

different enough not to be flat field noise. A normal pixel is left unaltered.

Flat field noise

BEFORE - the center pixel is found to be extremely close to the

surrounding pixels but not identical.

AFTER - The center pixel is replaced with an average (mean) of all of the

surrounding pixels to make it as similar as possible.

Stray pixels

BEFORE - the center pixel is found to be significantly different than the

surrounding pixels.

FTER - the center pixel is replaced with the "most typical" (median) pixel

from the surrounding pixels.

Setting the Custom filter

ou may select what percentage difference between the center pixel and the reference pixels will cause a pixel to be treated as a "stray pixel" or as "flat field" noise. This lets you "fine-tune" what pixels are being modified and what is being left untouched. The number you enter is a percentage. Any pixel that does not fall into either percentage set for "stray pixel" or "flat field" noise will be considered normal, and left unmodified.

For example, if you set the "stray pixel" to 95, any pixel that is 95% different or more than the surrounding pixels would be "stray." If you set the "flat field" noise to 5, any pixel that is 5% or less different than the surrounding pixels will be considered "flat field" noise. With these two settings, any pixel that was greater than 5% different but less than 95% different from the surrounding pixels would be "normal" and left unmodified.

NOTE: If you set the "stray pixel" difference to 0, all the pixels in the image will be considered "stray" and have a median filter applied to them. Likewise, if you set the "flat field" noise difference to 100, all the pixels will be considered "flat field" noise, and will have the mean filter applied to them.

Generally, you don't want to set both difference settings to the same number. For example if you set "stray pixels" to 50 and "flat field" noise to 50 you would effectively be telling the filter there were no normal pixels at all in the image. Everything less than 50% different would be treated as "flat field" noise, everything over 50% different would be treated as "stray pixels," and nothing would be treated as "normal."

Tips for filter use

Different source material often has different noise characteristics. The default settings will normally give you good results, but careful tuning of the parameters to your specific video may give better results. Experimentation is the key to setting these parameters. It's usually best to make fairly large changes at first and then back off once you "overshoot", rather than slowly "inching" up on your target.

NOTE: If you set a blur in the Processing sub-section, that blur will be evenly applied to all the pixels in an image after the noise reduction has been completed.

There is definitely some overlap in uses of the blur filter and the adaptive noise reduction filter. Both are useful to minimize noise. The blur filter generally makes the image look "softer" than the adaptive noise filter, and may reduce some compression artifacts more than the adaptive noise filter. Experimentation is the key to determining the right mix of video filters.