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In-Camera Editing Focuses On A New Design Era

Until recently, the digital camera's prime function was capturing images. Not any more. Now they can edit and enhance images. John Daniels looks at the new challenges for camera designers.

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Over the last decade, digital still camera (DSC) manufacturers have doggedly pursued a strategy of increasing megapixel count; shortening boot-up time, shutter lag and shot-to-shot delay; offering more optical zoom lens choices and reducing power consumption. The results have been impressive and translated into phenomenal sales.

Yet enhancement of the digital image, for either creative or corrective purposes, remained a post-exposure, post-download process dependent on secondary devices and photo-enhancement software for the PC.

Then in 2004, DSC manufacturers broke with the camera's heritage by introducing devices that not only capture images, but edit them, too. In one fell swoop, this cut a stage out of the process and enabled photographers to create superior images. These next-generation DSCs have set the standard for all camera designs to follow.

OPTICAL ILLUSIONS

When balancing the design factors of lens sharpness, weight, colour rendition and cost, every manufacturer must ultimately make compromises. In the past, those compromises bore a direct relationship to image quality and how good the camera was perceived to be.

Manufacturers are no longer handicapped by less expensive lenses as part of that compromise because once the characteristics for a particular lens are quantified, algorithms can be written to correct less-than-optimal features. The latest digital cameras, which use programmable digital media processors based on SoC technology, are sophisticated enough to execute the corrective algorithms in real-time — after image capture and prior to memory write — while maintaining short shot-to-shot delays. The SoC engines include an advanced DSP, plus a RISC microprocessor that carries out the imaging and video processing.

To achieve the highest quality video, any of the new video codecs can be embedded in these engines, including MPEG-1, MPEG-4 and H.264. Since codec development is so fast moving, several semiconductor manufacturers have designed chips that allow codec upgrades via downloads from the web.

ON THE RED-EYE

In-camera editing is not limited to optical lens corrections. It can be applied to a range of image corrections, including contrast, noise, demosaicing, edge definition, blur and eliminating red-eye. Of these, red-eye correction is receiving the most attention.

Rather than relying on power-consuming use of flashes or post-download retouching on a PC, this new approach corrects the red-eye image immediately after exposure. The camera again uses algorithms and the programmable digital media processor to detect the red-eye and correct the offending red spots prior to memory write. The process is automatic, making it a strong selling point for mid-to-upscale consumers.

BEFORE EXPOSURE

In-camera editing also provides several proactive pre-exposure improvements. Image stabilisation, for example, has long been available in certain SLR lenses costing upwards of 750 euros. However, these mechanical stabilisation techniques were too costly for use in low-cost DSCs.

Video-stabilisation algorithms, on the other hand, are able to track camera movement in real time and reduce blur caused by that movement digitally, all prior to image write. This requires significant number-crunching capabilities, but the latest programmable digital media processors are up to the task and are cheap enough to allow camera manufacturers to offer this

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feature at any price point.

This development was not a moment too soon, as DSC video capabilities in digital cameras have already taken a huge leap forward with both higher resolution and faster frame rates (VGA at 30fps).

The new stabilisation technique accommodates both the small size of today's DSCs and the fact that zoom telephoto lenses are now reaching the equivalent of a 300mm lens on a 35mm camera, enabling less-than-expert photographers to attain a 'steady hand' for video and still photography. The result will be smoother digital video and less blur on extreme zoom shots.

Intelligent contrast analysis is another aspect of in-camera photo editing available in the newest DSCs. Contrast analysis algorithms detect wide variations in contrast within the scene — think black dog in snow bank — and determine overall exposure as well as alter the post-exposure image to present the extremes of contrast. There are also 'smart' cameras that automatically detect the composition of the image and choose the appropriate portrait or landscape format.

ALTERED IMAGES

The new DSCs go further than correcting images; they enhance them, too. Panoramic capabilities, for instance, allow the photographer to take multiple, overlapping photos of a scene and then have the camera 'stitch' them together to form a single shot. This feature offers better results than the previous option of extreme wide-angle shots.

Photographers can also spice up their images by choosing borders, dialogue balloons and other special effects from an in-camera library, which can be upgraded. Improved audio adds to the user's creative options and can be embedded into the photo files.

These in-camera photo-editing features take on extra significance when WiFi capabilities are added to cameras. Photographers can shoot pictures, manipulate images on the spot and send them directly to a variety of places—their best friend via email, their home printer, a photo finisher for pick-up on their way home, or post them on to a web site.

NO MORE INTIMIDATION

The combination of in-camera editing features are redefining the point-and-shoot market. Rather than force a process of scene select, point, shoot, PC-download, retouch and enhance, followed by PC upload to print image or email, these new cameras will do it all themselves. PC-based photo editing will still have its uses for advanced users, but the majority of point-and-shoot photographers will be freed from the post-exposure editing process.

At the same time, in-camera editing will attract the larger, second-adopter sector to the digital marketplace. These are buyers who have so far been intimidated by the digital process. They don't know anything about photo editing and don't want to know. All they want is a high-quality digital photograph with a minimum of input from them, which is exactly what the new cameras deliver.

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
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