The 6sight Report

THE FUTURE OF IMAGING

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Processing Pixels

Printing Pictures

Photo book software

Analysts Argue Issues

Computational photography exceeds human vision

A digital camera captures light and color values, converts that information into digital data, and either stores the Raw image file for later processing on a personal computer, or, more commonly, applies an assortment of processing techniques to yield a pleasing but compressed JPEG photo.

Enthusiasts enjoy working with those unprocessed Raw exposures on a PC, but cameras constantly upgrade their internal image processing as well. It was primarily driven by the need to handle more exposures at ever faster speeds at higher resolutions — but a side effect is that there is a lot of computational power in those pocket-sized devices. And wouldn't it be a waste to leave it sitting unused?

Cameras now apply Photoshop-like "Pop Art" effects, combine multiple exposures, apply "makeup" functions that smooth skin and soften facial shadows, and most impressively, instantly combine dozens of shots into high-resolution panoramas — even editing out moving people or objects from the consecutive photos before stitching them together.

Computational photography means many things, including taking that original data and doing other processes that render otherwise invisible images, and even using other capture methods entirely to generate images we humans can discern.

It is not new: the combination of photography and computer science, goes back at least to the 1960's when NASA processed lunar images.

While the idea is not new, it is What's Next: As the computers on our desktops and in our cameras and other mobile devices continue to increase in raw power and refined capabilities, it is computational photography that holds the true future of imaging, not greater resolution sensors or ever-more evolved optics.

This issue spotlights Ramesh Raskar's keynote at the 2009 6Sight Future of Imaging Conference. Raskar is the head of the Camera Culture research group and codirector of the Center for Future Storytelling at the Massachusetts Institute of Technology. He focuses on developing tools to help capture and share visual experiences. His research includes cameras with unusual optical elements and programmable illumination. In 2004, Raskar received the TR100 Award from Technology Review, which recognizes top young innovators under the age of 35. In 2009, he was awarded a Sloan Research Fellowship and has received four Mitsubishi Electric Invention Awards. He holds 35 U.S. patents.

Inside this issue:

Cover and conference photos by Bill Fitz-Patrick

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