

Technology: UD546, “Single-Shot High Dynamic Range Imaging with Conventional Camera Hardware”

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Description:

This technology, spectrally selective single-shot high dynamic range imaging (S4HDR), makes it possible to take a high dynamic range (HDR) picture in a single shot using conventional camera hardware. Thus, it overcomes major obstacles in prior HDR imaging solutions, and offers a simplified way to obtain HDR images without expensive hardware upgrades. In addition, in the future it could enable the conversion of existing digital images to HDR images. Overall, this technology breaks the glass ceiling in HDR imaging technology, and introduces a new standard in method and performance.

As mentioned, the S4HDR works using a conventional hardware: a photographic filter on the lens and a color filter array associated with the image sensor. The photographic filter dictates the amount and characteristics of light that enters the lens. The color filter array separates the incoming light into blue, green, and red color channels. Then, the firmware associated with this invention processes the incoming lights, and merges them in a principled manner. Specifically, the color compensated lowpass is merged with the combined highpass to yield an HDR output image. In short, the technology uses exposure bracketing, but rather than on pixels, on color channels.

S4HDR improves upon previous methods of creating an HDR image. Usually those methods involved exposure bracketing, or combining, of multiple images taken in a very short time. One problem here is that moving objects inevitably appear with a “ghosting” effect. Another problem, as mentioned, is the need for complex hardware and specific purpose. S4HDR, by requiring only one shot and conventional hardware, involves a firmware update that greatly improves performance of simple cameras. Therefore, the costs of traditional HDR hardware are eliminated, as well as the costs of hardware updates.

In sum, this invention streamlines HDR imaging by using only one shot and a firmware update that processes the image. This is a first in the camera industry; previous HDR technologies have involved hardware costs and visual disadvantages that S4HDR overcome. Moreover, S4HDR is useful in numerous applications including security surveillance and cellular phone cameras.
