

RGB+: Exploiting Near-Infrared to Advance Computational Photography and Computer Vision

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Silicon-based digital camera sensors exhibit significant sensitivity beyond the visible spectrum (400-700nm). They are able to capture wavelengths up to 1100 nm, i.e., they are sensitive to near-infrared (NIR) radiation. This additional information is conventionally treated as noise and is absorbed by a NIR-blocking filter affixed to the sensor. This is sub-optimal, as the additional information provided by an NIR channel can significantly improve certain computational photography and computer vision tasks. Indeed, intrinsic properties of the NIR wavelength band guarantee that images can be sharper, less affected by man-made colorants, and more resilient to changing light conditions. I will show the benefits of using NIR images in conjunction with standard color images in applications such as haze removal, skin smoothing, single and multiple illuminant detection, shadow detection, and scene classification. The design of an imaging system that can simultaneously capture visible and NIR information on a single sensor will also be discussed.

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