Exposing Digital Forgeries in Color Filter Array Interpolated Images

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With the advent of low-cost and high-resolution digital cameras, and sophisticated photo editing software, digital images can be easily manipulated and altered. Although good forgeries may leave no visual clues of having been tampered with, they may, nevertheless, alter the underlying statistics of an image. Most digital cameras, for example, employ a single sensor in conjunction with a color filter array (CFA), and then interpolate the missing color samples to obtain a three channel color image. This interpolation introduces specific correlations which are likely to be destroyed when tampering with an image. We quantify the specific correlations introduced by CFA interpolation, and describe how these correlations, or lack thereof, can be automatically detected in any portion of an image. We show the efficacy of this approach in revealing traces of digital tampering in lossless and lossy compressed color images interpolated with several different CFA algorithms.