

Digital Image Forensics: There is More to a Picture Than Meets the Eye

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The past decade has witnessed remarkable advances in digital image processing and computational photography, resulting in sophisticated image-editing software systems. The ease of digital image manipulation has also posed many new challenges. In particular, digital images have become more vulnerable to malicious tampering compared to their non-digital counterparts. This circumstance galvanize rapid developments of research in digital image forensics.

In this talk, I will focus on my recent works in detecting several types of digital image tampering operations, including:

- region duplication, where regions in the same image is copied, transformed, and pasted to new locations to conceal the original image contents;
- image splicing, where regions from an image is pasted into a different image;
- photographic or photorealistic, where the task is to differentiate a real photograph from an image made from computer graphics software.

The unifying theme of these techniques is to use statistical analysis of normal natural photographic image signals to show abnormalities of tampered images. I will describe the mathematical and algorithmic aspects of these methods, and demonstrate their effectiveness on realistic image forgeries.

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