Shadows and light: Researchers develop new software to detect forged photos

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Dartmouth and UC Berkeley researchers have developed new software to detect faked photos, using a geometric algorithm to locate inconsistent shadows that are not obvious to the naked eye.

The new method is a significant step in the field of digital forensics, which national security agencies, the media, scientific journals and others use to differentiate between authentic images and computerized forgeries.

The study, titled "Exposing Photo Manipulation with Inconsistent Shadows," was presented last week at the Association for Computing Machinery's SIGGRAPH conference and is to be published in the journal *ACM Transactions on Graphics* in September.

The new forensic method analyzes a variety of shadows in an image to determine if they are physically consistent with a single illuminating light source. This allows a forensic analyst to determine if a photo is physically plausible or the result of image fakery. This method has, for example, debunked the claims that the lighting and shadows in the famous 1969 moon landing photo are fake.

"Our method shifts the dialogue from 'does the lighting/shadow look correct?,' which is well known to be highly unreliable, to a discussion of whether an analyst has correctly selected the location of cast and attached shadows in an image, a far more objective task," says senior author Hany Farid, a professor of computer science and head of the

Image Science Group at Dartmouth. "In this regard, our method lets humans do what computers are poor at—understanding scene content—and lets the computer do what humans are poor at—assessing the validity of geometric constraints."

More information: www.cs.dartmouth.edu/farid/dow … ions/tog13/tog13.pdf

Provided by Dartmouth College