System and Method for Diffuse Imaging with Time-varying Illumination Intensity
Technology #15072

Applications

This technology is useful for imaging applications in which it is desirable to achieve finer resolution than provided directly by the optical components.

Problem Addressed

Conventional imaging uses steady-state illumination and light sensing with focusing optics and does not exploit variations of the light with time. This invention presents a new method for imaging without focusing optics such as lenses and mirrors.

Technology

This invention introduces a diffuse imaging framework through which a focused image is produced without optical focus; instead, the image is reconstructed from time-resolved measurements of light intensity in response to time-varying scene illumination. The imaging system is made up of a source of scene illumination with intensity varying in time, a light meter for time-resolved measurement of the intensity of light incident, and a means to record time-resolved light meter outputs.

Advantages

- Diffuse imaging opens up possibilities for forming images without lenses and mirrors and enables the implementation of challenging new applications such as imaging occluded scenes
- This technology makes building practical imaging systems using non-ultrafast, optoelectronic hardware possible

Categories For This Invention:

Photonics
Sensors (Photonics)
Cameras
Imagers

Intellectual Property:

System and method for diffuse imaging with time-varying illumination intensity
Issued US Patent
9,759,995
Inventors:
Ahmed Kirmani
Vivek Goyal

Publications:
Diffuse Imaging: Creating Optical Images with Unfocused Time-Resolved Illumination and Sensing
Signal Processing Letters, IEEE
31 October 2011. Pages 31 - 34, (Volume:19 , Issue: 1)

External Links:
Research Laboratory of Electronics
http://www.rle.mit.edu/

Image Gallery:

![Image Gallery](image_url)