Fluorescence Microscopy with an Ideal sCMOS Camera

A software to correct sCMOS-related noise

Inventors at Georgia Tech have developed a software for the Automatic Correction for sCMOS-related Noise (ACsN). This combines an accurate estimation of noise variation with sparse filtering to eliminate the most relevant noise sources in the images of a sCMOS sensor, approaching the performance of an ideal camera. This near-ideal conditions result in a drastic reduction of pixel-dependent noise in sCMOS images and an enhanced stability of denoising performance at a competitive computational speed. This software is also compatible with low-cost CMOS cameras.

Summary Bullets

- **Fast** – produces fully quantitative sCMOS image restoration up to 100 times faster than the current state-of-the-art
- **Accurate** – produces fully quantitative sCMOS image restoration up to two orders of magnitude more accurate than the current state-of-the-art
- **Improved features** – allows a broad range of imaging techniques without compromising data reliability

Solution Advantages

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Potential Commercial Applications

- Improving CMOS cameras- cell biology imaging

Background and More Information

Cell biology has an ever increasing demand for sharper, faster and gentler imaging techniques. For this reason, scientific Complementary Metal-oxide Semiconductor (sCMOS) cameras have been usually preferred to

Electron Multiplying Charge-Coupled Devices (EMCCD), because they provide higher frame rates, wider field-of-view and substantially lower electrical noise. However, sCMOS have higher readout noise and extra fixed pattern noise sources compared to EMCCDs, which limits their performance especially in low-light conditions necessary to ensure that imaging has a minimal impact on the observed biological processes.

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IP Status

The following patent application has published<o:p></o:p> : US20220198611A1

Publications

Fast and accurate sCMOS noise correction for fluorescence microscopy, Nature Communications - January 3, 2020

Images

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