Southern Illinois University System

Applications

- CMOS-based image sensors
- Distributed image sensors
- Internet of things (IOT)
- Natural image capture equipment (medical diagnostics, automotive, security cameras, etc.)

Inventor(s)

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Dr. Tragoudas is a professor of electrical and computer engineering at SIU Carbondale. He serves as the department chair and is site director for SIU's NSF Center for Embedded Systems.

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Mr. Leitner earned an ME from SIU Carbondale's Department of Electrical and Computer Engineering and an MS from the Department of Mathematics.

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Compressive Image Sensor with Sparse Measurement Matrix

Image capture sensors have become ubiquitous in consumer electronics, medical, defense, automotive, and other applications. The image sensing industry now faces a steep challenge to compress the massive amounts of visual data generated into usable information. Conventional compression methods require complex circuits that are too large, expensive, and inefficient to meet the growing needs of distributed sensing and the internet of things.
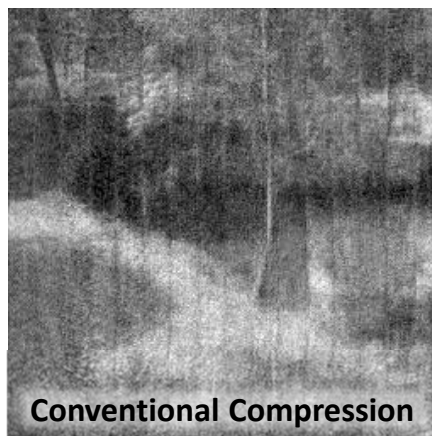
Invention

SIU researchers have developed improved hardware and processes for compressive sensing based on CMOS image sensors. The technology reduces power consumption by 4-8x, dramatically simplifies circuitry, and results in substantial image quality improvement without increasing data storage requirements (see comparison with conventional compression below).

Key Advantages

- High peak signal to noise ratio (PSNR)
- Low power consumption
- Reduced sensor size
- Elegant design to reduce failure modes and increase reliability
- Not susceptible to clock errors
- Suitable for scaling to high-resolution image sensors
- High image sensor fill factors

Status

U.S. patent #10,240,910 issued March 26, 2019. The technology is available for license.

Conventional Compression   **Enhanced Compression**

Other opportunities related to this technology, including but not limited to sponsored and/or collaborative research, may be available. Please reach out to the designated contact identified at left for more information.