Snapshot Plenoptic Imaging Spectrometer

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Technology description

Invention

This technology is a specialized plenoptic imaging system that is capable of not only gathering spatial and angular information but also hyperspectral and polarization information. The configuration of the system is that of a snapshot imager, which greatly increases its practicality and ease of use.

Background

Advanced camera systems generally rely on multiple imaging modalities to obtain cutting-edge information from a scene. One type of advanced imaging system, known as the plenoptic camera, is able to capture not only color and spatial information, but also angular information about light rays that enter the camera. This unique feature allows it to give a 3D rendering to a scene captured by a 2D detector. Other important types of information found in any real-world scene include spectral and polarization information. Hyperspectral imaging can yield great quantities of data for analysis in earth sciences, medical diagnostics, and other fields. Similarly, polarimetric data can provide useful information about object orientation, material identification, and other qualities of an object. Being able to combine these various modalities into one system would provide a powerful instrument capable of combining data in new ways to greatly improve information quality. Such an expansive system could also be adapted to many types of imaging applications.

Application area

Biomedical imaging to target tracking and identification
Medical diagnostics
Data analysis for earth sciences

Advantages

Adaptability for a wide range of applications
Multiple imaging modalities in one
Snapshot system for quick acquisition

Institution

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