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WHITE PAPERS & APPLICATION NOTES



From Hyperspectral Data to a Working End-user Application in the Industry

This white paper covers the past challenges of using hyperspectral imaging in industrial, machine vision applications. Newer technology is not all created equally and this paper aims to guide the reader in important aspects of choosing a system, considering a new value proposition that takes into account all types of hyperspectral technologies on the market today. It also discusses the importance of hardware and software integration, along with having application-specific support from a manufacturer. All these factors together determine degree and speed of success in implementing a hyperspectral system for machine vision applications.

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From hyperspectral data to a working end-user application in the industry

Hyperspectral technology is suitable for sorting and quality control in industries including, but not limited to, geology, agriculture, food, recycling, plastics, and pharmaceuticals.

Traditionally, the turnaround time from the acquisition of hyperspectral data for a specific application to having developed a working algorithm or model for a given application is very long. The time to have that model implemented and sorting or rating the products in real-time is even longer!

Advances in hyperspectral technology have paved the way for making this process a lot easier, faster, and cheaper.

Pushbroom architecture gives best performance per pixel. Pushbroom architecture captures a narrow line of the spatial scene and all the spectral information of that scene simultaneously.

Many other architectures do not capture all spectral information of the same pixel at the same time, which will compromise the quality of the data if the data cannot be reconstructed to a very high accuracy. A good optical and opto-mechanical pushbroom design will yield better spectral fidelity per pixel than other optical architectures.

Industrial camera

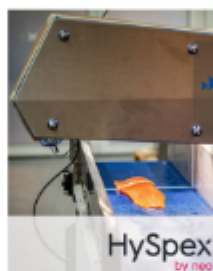
Today, the industrial hyperspectral market is flooded with cameras that have a lot of spectral and spatial distortions with blurry optics. Such a system will perform unreliably and limit the capabilities of the systems.

To combat this problem, the HySpex Balisar line of cameras has a spectral resolution of exactly 2 bands, making it spectrally more repeatable to avoid spectral aliasing, while preserving spatial sharpness.

All Balisar instruments offer affordability without compromising data quality; that is, all Balisar systems were designed to have low spatial and spectral distortions, making them ideal for industrial applications.

Redefining Value

When selecting a hyperspectral camera for an application, the most important factor is determining the smallest object to be detected. A camera offering at least two effective pixels per object (in one direction) should be chosen. The size of the conveyor belt, for example, will define how many effective pixels and, thus, active pixels for that system, are needed for the specific application.



HySpex

by neo

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