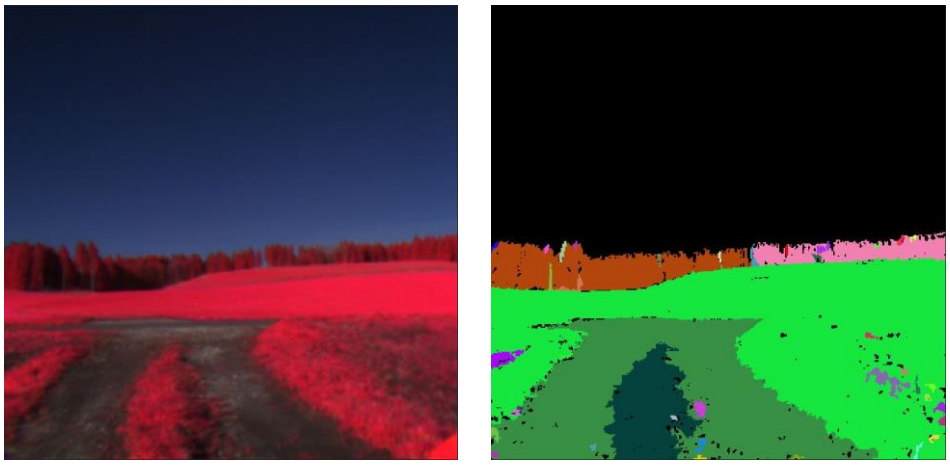
Analyzing
Hyperspectral Data in Real-Time

perClass **Mira**

Applying Machine Learning

Mira is a software interface for analyzing hyperspectral image data. Based on a powerful machine learning engine Mira selects the best statistical model for given labeled samples fully automatically.

Mira helps creating specific solutions for image analysis that can be applied to Cubert's hyperspectral snapshot cameras, such as the ULTRIS 20, in live mode.



ULTRIS 20 image of a hilly landscape in colored infrared (left) and segmented by Mira (right). The semantic information is displayed in different colors.

Intelligent Software Solution

Advantages

- Easy-to-use image classification & regression tool
- Automated model building
- Interactive fine-tuning
- Pixel classification & object segmentation
- Applicable to the hyperspectral live data stream

Flexible and Easy-to-use

Applications

- Food quality control
- Plant disease detection
- Medical and pharmaceutic assessments
- Supervision of production processes
- Suited for full machine vision integration
- Time-critical and non-destructive assessments in any industrial environment

Quality Assurance through Quantification and Qualification

Gathering hyperspectral images is only the first step of solving a problem. Analyzing the data can be challenging and time-consuming. It typically requires software development and a high level of expertise in applied statistics, math and remote sensing.

Mira enables anyone to create an interpretation solution timesaving and without needing this expertise - (1) record spectral data with your Cubert camera, (2) transfer this data to Mira and train as well as evaluate an efficient classifier for specific materials, and (3) apply this classifier to the live data stream as plugin in the Cubert Utils software.

With Mira users can **quantify** the composition of the hyperspectral image fully automatically. Furthermore, Mira allows you to **qualify** the samples in the image. Check if your fruits have rot, identify foreign objects during your production process or evaluate the degree of skin burns – within seconds!

Training the model

Import your hyperspectral image to Mira. Define multiple classes for your samples. Label those classes in the image allowing Mira to learn on this training data. Mira analyzes this data and creates a classification using machine learning.

Pixel classification

Mira assigns each pixel to the predefined classes. The composition of your samples in the hyperspectral image is gathered fully automatically. Validate the result of the trained classifier and fine-tune the model interactively.

Object segmentation

Mira is also able to count the number of different objects, i.e. connected components, in the image. Set a threshold for the size to adapt to your individual application. Classify the pixels within an object and let Mira identify outliers.

sales@cubert-gmbh.de | Tel.: +49 731 705156 00
Cubert GmbH | Lise-Meitner-Straße 8/1 | 89081 Ulm | Germany
www.cubert-gmbh.com

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REAL-TIME SPECTRAL IMAGING