

# Statistical Features Method

Statistical features can provide valuable information alongside a CCI-Feature or a Case-Feature. Use this feature to get statistical properties of spectra resolved by pixels in the scene.

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## Function

Statistically derived properties of spectra are obtained. The resulting image describes statistical values by their gray values. Statistical features are typically used as additional information together with a Case- and/or CCI-Feature. For example; the discrimination of background and foreground often can be done very robustly by means of the mean intensity feature. By streaming such a statistical information parallel to a CCI-Feature (classification IDs), the client machine vision application might be able to distinguish foreground from background objects more robustly.

## User Interface

The screenshot displays the Perception Studio software interface. The top menu bar includes Start, Setup, Acquire, Explore, Model, and View. The main toolbar contains various icons for editing, preprocessing, CCI, classification, and data. The 'Statistical' feature icon is highlighted with a red box. The interface is divided into several panels:

- Import/Export/Delete:** Shows a tree view of data sources, including 'Polymers (NIR) \*' and 'polymers \*'.
- Data:** Displays metadata for the selected data, such as Name (polymers), Sample Size (68), Spatial Size (233), and Spectral Size (233).
- Description:** Provides detailed information about the sample, including Template (Custom), Title (Polymer Samples), Category (Recycling), Sample Description (PA (upper position), PMMA (middle position) PP (lower position) s2f25f54), Sample ID (201401231125), Sample Location (Lab\_1, Shelf A), Original Donor (PP / Jacqueline), Date of Meas. (2014-01-06), Meas. System (Inno-spec RedEye NIR, 60um slit), and Meas. Setup (Fore optic: KOWAB0, illum.: Halogen 2x8v25W, backgr.: white tile).
- Input/Preview:** Shows a vertical stack of three images representing different polymer samples.
- Output:** Shows a vertical stack of three grayscale images representing the statistical features extracted from the input images.
- Selected Spectra:** A line graph showing Intensity (Y-axis, 0.15 to 1.05) versus Wavelength [nm] (X-axis, 1000 to 1600). The graph displays four spectra: PA (green), PMMA (yellow), PP (blue), and Background (black).
- Method:** Shows the selected method as 'Statistical [Statistical Feature]'.
- Statistical Feature:** A dropdown menu showing the selected feature as 'Mean'.

The data set *plastics* is loaded (the data set is selected in the project browser to the left). Per plastic group a spectra set is defined and is shown in the *Selected Spectra* graph as well as their originating pixel positions by colored markers in the *Input* view.

The model method *Statistical Features* is selected in the ribbon menu. The control panel of this method is shown on the lower right. The result of the method is shown in the *Output* view.

The preprocessing method *Intensity* is selected in the ribbon menu. The statistical feature *Mean* is selected. Spectra are shown in the range ~1000-1700nm.

The pixel values of the output image correspond to the mean of all reflectance spectra in the range from 1000-1700nm. Therefore, the output corresponds to the relative reflectance degree of 3 plastic plates in the NIR-range (1000-1700nm).

On the left hand side, information on the loaded data set are available like the *Statistics* panel as well as descriptive parameters attached to the data set.

## Method Parameters

Method parameters are shown in the panel to the lower left of the perspective.

### Statistical feature selector

Select a feature of interest

#### Minimum

The output image corresponds to the statistical minimum value of spectra per pixel.

#### Maximum

The output image corresponds to the statistical maximum value of spectra per pixel.

#### Mean

The output image corresponds to the statistical mean value of spectra per pixel.

#### Dynamic

The output image corresponds to the statistical dynamic of spectra per pixel. The dynamic is the difference of maximum and minimum.

## Work Flow

- Select one of the statistical methods
- Apply preprocessing
- Study the gained output image
- Save the model for later usage (e.g. to set up the live streaming)

## Mentioned in:

### Found 3 search result(s) for "statistical feature".

Page: [UDP Streaming Protocol Definition \(Manuals\)](#)

... 3 (RGB). depends on the model, which was used to create the stream. e.g. a CCI **feature** will produce a color image stream with spectral size = 3 (RGB), a **statistical feature** will create a grayscale stream with spectral size = 1 15 uint8 Bytes per ...

Jun 02, 2020

Page: [Hyperspectral imaging step by step \(Manuals\)](#)

... pixel value. modelDyn1stDerplastics.png The **statistical feature** methods allows an extraction of information based on **statistical** methodology. Preprocessing 1st derivative was applied to the data beforehand. The spectral dynamic is extracted ... class ID per taught material (i.e. per spectra set). Model a ...

Jul 07, 2020

Page: [Exploratory analysis of plastics \(Manuals\)](#)

... cube is visualized in form of a color or a monochrome image. The image information is obtained by applying **feature** functions to the hyperspectral cube. cubeprojection.png As default, the preview **feature** is selected (in the ribbons **Feature** group) and results in a color image. By selecting a **statistical feature** like Mean, the mean ...

Jun 16, 2020