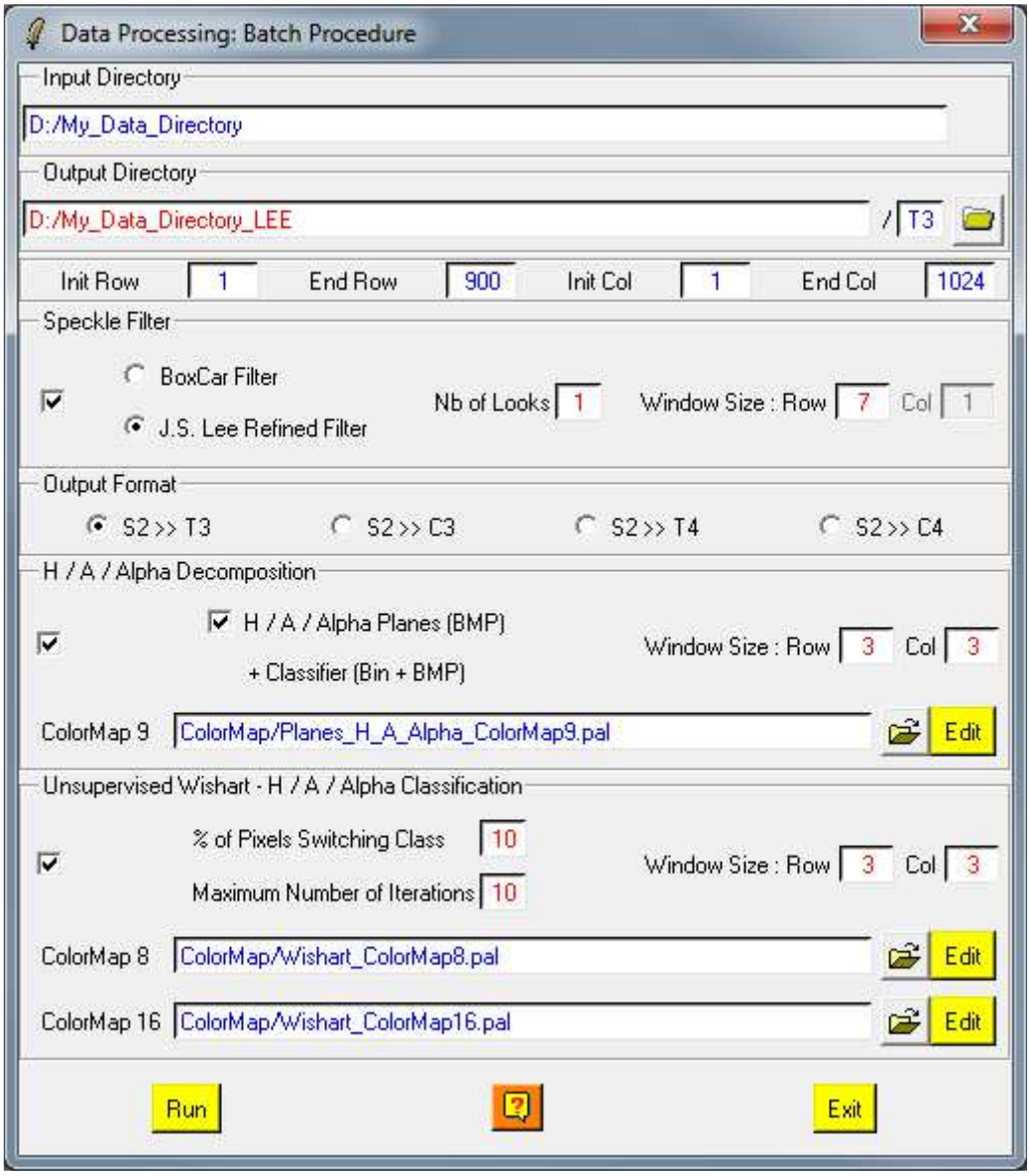
Batch Process



Description:

This function is used to apply **sequentially** different polarimetric data processes. The different steps of this batch process are:

- Speckle Filter (BoxCar, JS Lee refined filter)
- H / A / Alpha Decomposition and analysis
- Unsupervised Wishart - H / A / Alpha Classification

This basic processing approach provides a first **qualitative analysis** of the fully polarimetric data set processed.

This functionality is only available for :

- **[S2]** : 2x2 complex Scattering Matrix raw binary data (monostatic case).
- **[S2]** : 2x2 complex Scattering Matrix raw binary data (bistatic case).

Comments:

Parameters written in Red can be modified directly by the user from the keyboard

Input/Output Arguments:

Input Directory	Indicates the location of the considered **Main Directory** containing the polarimetric data sets to be processed.
Output Directory	Indicates the location of the data output directory.

Output Image Number of Rows/Columns:

The output image numbers of rows and columns are initialised to the input data set dimensions.
Users wishing to process a sub-part of the initial image can modify the **Init** and **End** values of the converted images rows and columns.
Note: init and end values have to remain within the range defined by the input image dimensions.

Output Format:

As incoherent averaging will be introduced during the different data processing, this function is used to select the data output format.

[S2] >> [T3]	Raw Binary Data will be converted during processing to (3x3) complex Coherency **[T3]** matrix in case of (2x2) complex Sinclair monostatic **[S2]** matrix.
[S2] >> [C3]	Raw Binary Data will be converted during processing to (3x3) complex Covariance **[C3]** matrix in case of (2x2) complex Sinclair monostatic **[S2]** matrix.
[S2] >> [T4]	Raw Binary Data will be converted during processing to (4x4) complex Coherency **[T4]** matrix in case of (2x2) complex Sinclair bistatic **[S2]** matrix.
[S2] >> [C4]	Raw Binary Data will be converted during processing to (3x3) complex Covariance **[C4]** matrix in case of (2x2) complex Sinclair bistatic **[S2]** matrix.

Speckle Filter:

This function is used to apply a Polarimetric Speckle filtering on polarimetric raw binary datasets. Two Polarimetric Speckle Filters are proposed

Box Car Filter	This function filters polarimetric raw binary datasets using a Boxcar filter which performs incoherent averaging within a (N*N) sliding window (W).

Filtering Parameters

- **Window Size**: Users have to set the size of the (N*N) sliding window used to compute the local estimate of the average matrix. The default value of N is set to **7**.

Note : The default value of the **Output Directory** is set automatically to : **Main Directory_BOX / X3** where **X3** stands for **T3, C3, T4 or C4** according to the data output format selected.

J.S. Lee Refined Filter

This function filters polarimetric raw binary data sets using the J.S. Lee refined filter which estimates local statistics within a (N*N) sliding window (W) and filters data in an adaptive way by minimizing a least square constraint.
This refined approach also includes the use of directional masks for the local statistics estimation.

Filtering Parameters

- **Number of Looks**: Users have to set the Input data equivalent number of looks used to compute the a priori input speckle noise variance. The default value of N is set to **1**.
- **Window Size**: Users have to set the size of the (N*N) sliding window used to compute the local estimate of the average matrix. The default value of N is set to **7**.

Note : The default value of the **Output Directory** is set automatically to : **Main Directory_LEE / X3** where **X3** stands for **T3, C3, T4 or C4** according to the data output format selected.

H/A/Alpha Decomposition:

This program creates binary files corresponding to the different polarimetric descriptors obtained from the H/A/Alpha decomposition.
The H/A/Alpha polarimetric decomposition is based on an eigenvector decomposition of the coherency matrix.
An option may be set to simultaneously create the corresponding bitmap image files.

Processing Parameters

Data to be decomposed may be processed through an additional filtering procedure consisting of a boxcar filter. Users have then to set the size of the (N*N) sliding window used to compute the local estimate of the average matrix.
The default value of N is set to **0**. Users wishing to avoid additional filtering may set N to **1**.

H/A/Alpha Planes

The classification procedure creates three output files

- A classified data binary file containing the class index of each pixel of the input image.
- The corresponding bitmap image file.
- A bitmap image file indicating the pixels occurrence (density) in the selected classification plane.
- A bitmap image file indicating the location of classified data in the selected classification plane.

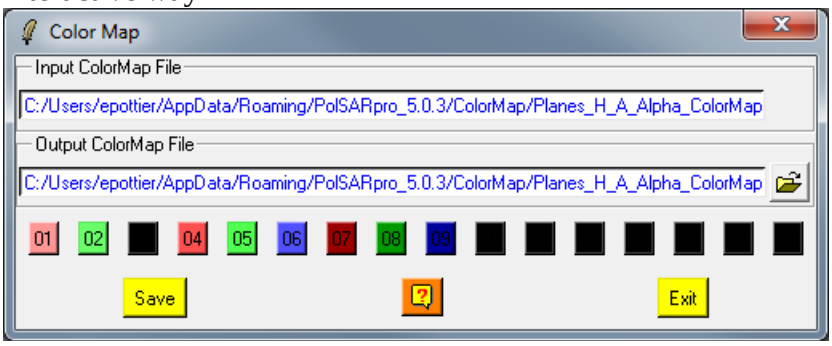
The different output files are

- H_alpha_class.bin; H_alpha_class.bmp;

- H_alpha_occurence_plane.bmp;
- H_alpha_segmented_plane.bmp;

ColorMap 9

The color coding of the bitmap output files is realized by the way of a 9 element colormap initialised with arbitrary values. Users have the possibility to modify the elements of the colormap in an interactive way



Unsupervised Wishart - H/A/Alpha Classification:

This program creates binary and bitmap image files resulting from the segmentation of polarimetric data using the Wishart H-Alpha and Wishart H-A-Alpha schemes.

Output Files

Each classification procedures creates ouput binary files and the corresponding optional bitmap image files.

- wishart_H_alpha_class_x.bin (.bmp)
- wishart_H_A_alpha_class_x.bin (.bmp)

The variable x indicates the window size of the eventual additional filtering performed prior to data classification.

Processing Parameters

Data to be decomposed may be processed through an additional filtering procedure consisting of a boxcar filter. Users have then to set the size of the (N*N) sliding window used to compute the local estimate of the average matrix.
The default value of N is set to **0**. Users wishing to avoid additional filtering may set N to **1**.

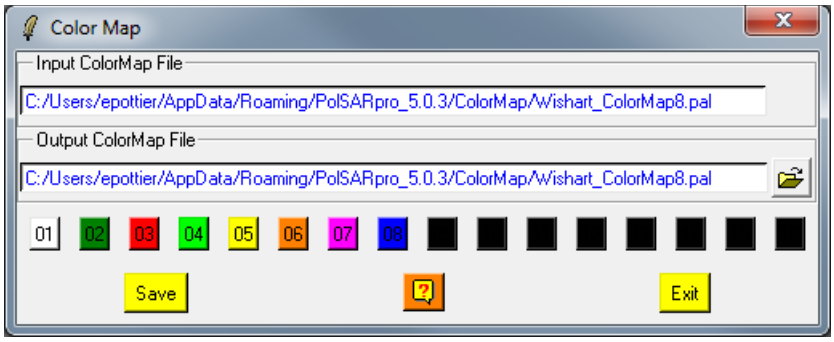
The segmentation termination criterion consists of a logical combination of two conditions.
The iterative k-mean clustering procedure is stopped if :

- A sufficiently low percentage of pixels switch class from one iteration to the other.
- The number of iterations reaches a maximum value

Numerical values are automatically set to default values and may be modified.

ColorMaps

The color coding of the bitmap output files is realized by the way of a 8 or 16 element colormap initialized with arbitrary values. Users have the possibility to modify the elements of the colormaps in an interactive way.


Color Map
Input ColorMap File
C:/Users/epottier/AppData/Roaming/PolSARpro_5.0.3/ColorMap/Wishart_ColorMap8.pal
Output ColorMap File
C:/Users/epottier/AppData/Roaming/PolSARpro_5.0.3/ColorMap/Wishart_ColorMap8.pal
01
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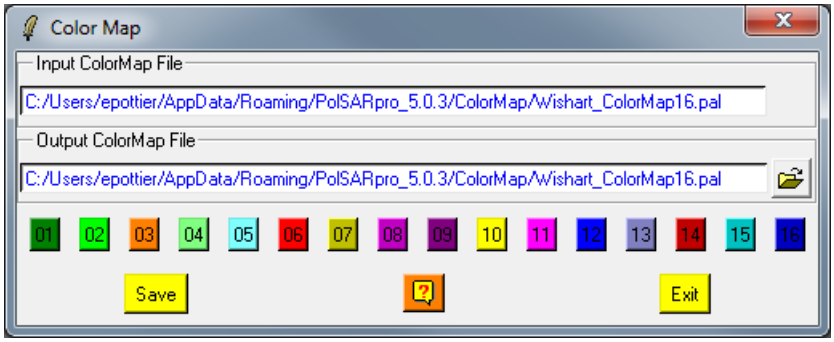
Save
Exit


Color Map
Input ColorMap File
C:/Users/epottier/AppData/Roaming/PolSARpro_5.0.3/ColorMap/Wishart_ColorMap16.pal
Output ColorMap File
C:/Users/epottier/AppData/Roaming/PolSARpro_5.0.3/ColorMap/Wishart_ColorMap16.pal
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Save
Exit