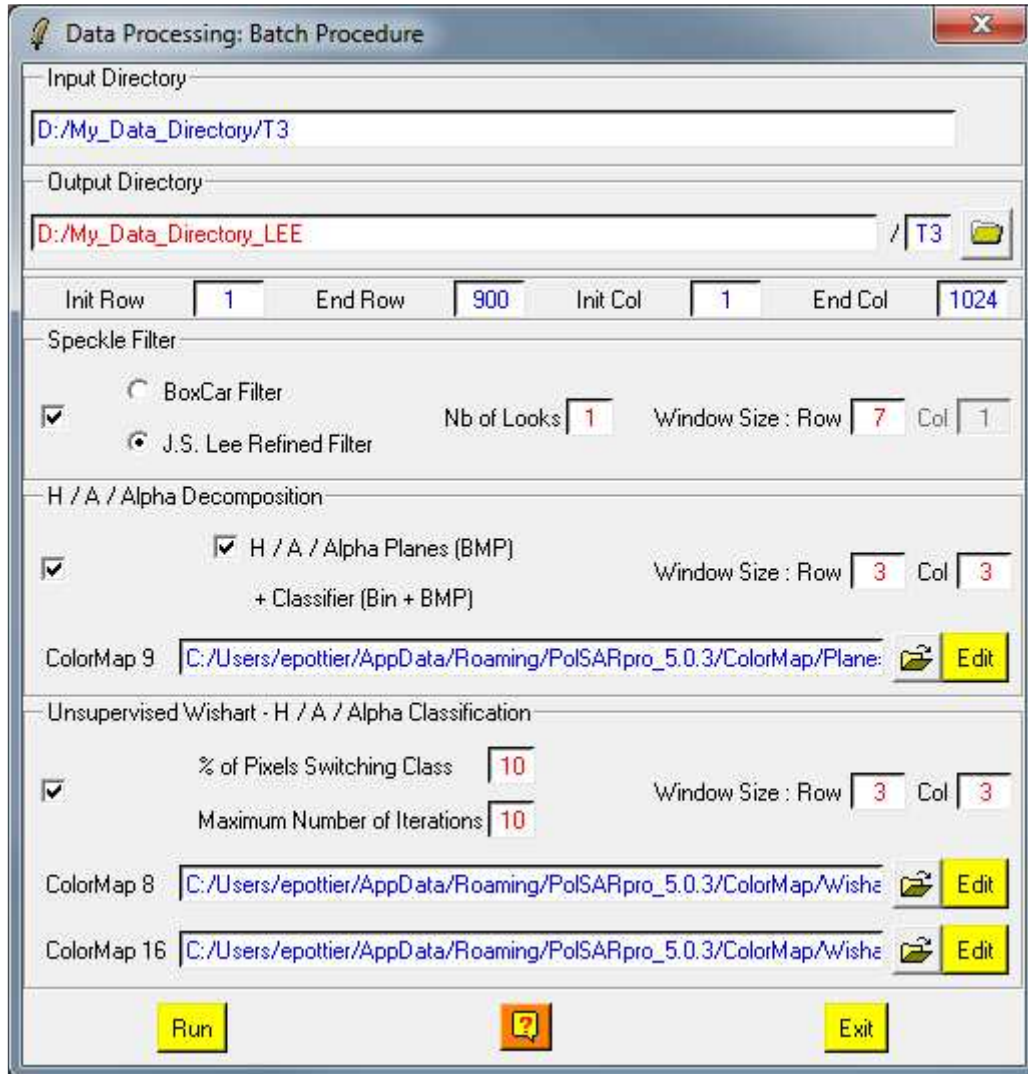# Batch Process

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 :

- **[T3]** : 3x3 complex Coherency Matrix raw binary data.
- **[C3]** : 3x3 complex Covariance Matrix raw binary data.

- **[T4]** : 4x4 complex Coherency Matrix raw binary data.
- **[C4]** : 4x4 complex Covariance Matrix raw binary data.

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.

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**.

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

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.

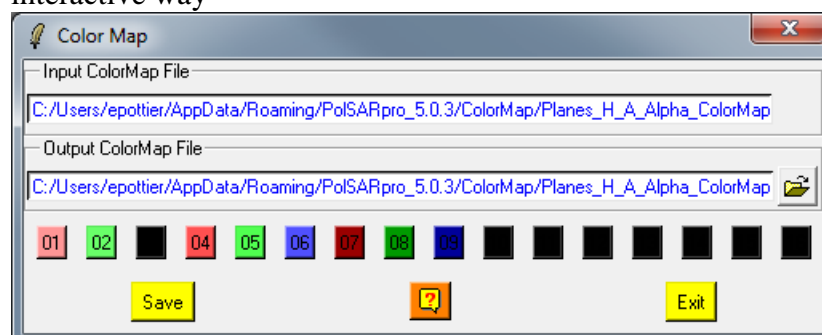|	
Processing Parameters	Data to be decomposed may be processed through an additional filtering procedure consisting of a boxcar filter. Users have then to set the size of the (N*N) sliding window used to compute the local estimate of the average matrix. The default value of N is set to **0**. Users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