

Content

Main folder

usermanual.pdf : user guide describing how to use the programmes.

content.pdf: this document.

src-modis-chain: folder containing the sources and binaries and described below.

Source folder and installation

The programs are precompiled on a Linux Mandrake v10.1.

To recompile the processing chain (not the libraries), type in 'make clean' then 'make';

To recompile everything from scratch, including libraries, type in 'make veryclean' then 'make'.

The source folder contains the following subfolders:

- **bin**: where all binaries are stored after compilation. There are 6 subfolders: common (programs common to all processing chains), then one folder per processing chain.
- **infra**: contains the required libraries, in particular a standalone version of Inrimage (INRIA).
- **lib**: the compiled Inrimage library.
- **obj**: where all object files are stored during compilation.
- **scripts**: programmes available as shell scripts.
- **src**: sources of the classification programmes.

Program list

The processing chains are constituted of a succession of small programs (see the user manual).

These programmes can be classified into 3 types:

- **Infrastructure**: software for manipulating images in the Inrimage format on Windows or Linux platforms. The software is an adaptation of the original Inrimage library, developed at INRIA, for use under Windows and Linux indifferently. Additional utilities are provided on top of Inrimage: I/O routines for managing ENVI headers, systematic management of a region of interest within images, basic image manipulation (arithmetic, format conversion, extraction of a region of interest), batch processing of a large number of images in a folder, management of dates, extraction of profiles. The prefix of these programs is **inr**.
- **Sequence**: software for general operations with multitemporal imagery in Inrimage format, that are important for the processing chains analysing data from the MODIS, NOAA or any other sensor, provided certain requirements on the format of input data are respected. These comprise: interpolation of bad quality data, computation of features, classification specific programmes (training, computation of memberships, classification), classification postprocessing, pixel unmixing. The prefix of these programs is **sequence**.
- **Modis**: software for specific operations on data obtained by the Modis sensor. This includes the interpretation of the MODIS metadata for selecting high quality images, for computing dates, etc. The prefix of these programs is **modis**.

The largest part of the programmes is common to all processing chains. This includes the infrastructure programmes, the Modis-specific ones, and generic multitemporal image manipulation programmes (generic in the sense that they do not depend upon a specific classification method). All classification specific programmes are relevant to the 'sequence' programmes and are stored in distinct folders.

Programs common to all processing chains:

Infrastructure

envi2inr : converts and image in ENVI format to Inrimage format.

hdfraw2inr: converts an image in HDFRAW format (output of the NASA's ModisTool) to inrimage.

inr_convert-type: performs format conversion (eg integer to float) on Inrimage images.

inr_crop: extracts a region of interest out of an image.

inr_getlayer : extracts a layer out of a multi-frame image.

inr_maskinvert: performs a logical negation on a mask image.

inr_merge: merge values of two images.

inr_multiply: pixel per pixel multiplication of two images.

inr_ndvi: computes NDVI from red and near infrared images.

inr_normalize: normalizes (between 0 and 1) an image.

inr_pixelcompare: pixel per pixel comparison of two images.

inr_proportions: computes the proportion image out of a high resolution classification and a low resolution mask.

inr_proportions2purepixels: computes pure pixels out of a proportion image.

inr_proportions_setclass: allows interactive modifications of a proportion image.

inr_sequence: builds an image sequence out of individual frames.

inr_setpixels: allows interactive modifications of an image.

inr_translate: apply a translation file to an image's pixels values.

inr_translate_defor: same, additionally output a deforestation mask.

inr_visuprofile: extracts a pixel profiles and outputs it in ASCII in a format suitable for visualization.

Generic multitemporal image processing

sequence_classification_setcolor: assign colors to a classification image.

sequence_classification_stats: computes confusion matrices.

sequence_cloudcorrection: filters out cloudy pixels.

sequence_fit_profiles: fit a MODIS profile by polynomials.

sequence_poly_fit a multitemporal MODIS image (applies sequence_fit_profiles to each pixel)

sequence_profile_deforestation: generates a synthetic deforestation profile.

sequence_profiles: computes the profiles of each class by unmixing a linear mixture model.

sequence_profiles_purepixels: computes the profiles of each class based on pure pixels.

sequence_profiles_purepixels_fit: same, performing an additional fit by a polynomial.

sequence_proportions_estimation: assess the proportions by unmixing the observed profile.

sequence_proportions_estimation_local: same, the classes being restricted to the neighbouring classes.

sequence_proportions_estimation_premax: same, the classes are computed using only the ascending part of the profile.

sequence_proportions_mergeclassif: merge a pure pixel and a proportion classification.

sequence_proportions_stats: compute confusion matrices using proportion classification images.

Modis specific

modis_datelist: analyses the name of an original MODIS datafile to compute the acquisition date.

modis_GQKcoverage2mask: applies GQK coverage metadata.

modis_GQKquality2mask: applies GQK quality metadata.

modis_GSTevaluate: assess on the basis of GST metadata if an image is suitable for processing.

modis_GSTstate2cloudmask: computes a 250m cloud mask from GST 1km metadata.

modis_MOD35_2_cloudmask: converts a MOD35 3 band images to a 250m cloud mask.

modis_stats: compute the mean MODIS reflectance in a masked area.

modis_VIquality2mask: converts MOD13Q1 metadata to quality mask.

Programs specific to the CHAIN10F-ML chain

Sequence_profile_features: computes the 10 features from the profiles.

Sequence_classification_train: trains the ML classifier.

Sequence_classification_apply (and apply_std) : applies the ML classifier (the 'std' version uses a hard-coded variance of features).

Programs specific to the CHAIN12F-ML chain

Sequence_profiles_features_upgraded: computes the 12 features (common to all 12F chains).

Sequence_classification_train, classification_apply and classification_apply_std are the same as for CHAIN10F-OLD_ML

Programs specific to the CHAIN12F-MAHA chain

Sequence_profiles_features_upgraded: computes the 12 features (common to all 12F chains).

Sequence_membership_maha: computes class membership using Mahalanobis distance.

Sequence_classification_train_maha : trains the classifier

Sequence_fuzzyclassification_apply : applies the classifier (common to CHAIN12-FUZZY chains).

Programs specific to the CHAIN12F-FUZZY-DS chain

Sequence_profiles_features_upgraded: computes the 12 features (common to all 12F chains).

Sequence_membership_ds: compute membership functions for the Dempster Shafer strategy.

Sequence_classification_train_ds: trains the classifier.

Sequence_fuzzy_classification_apply : applies the classifier.

Programs specific to the CHAIN12F-FUZZY-WA chain

Sequence_profiles_features_upgraded: computes the 12 features (common to all 12F chains).

Sequence_membership_wa: compute membership functions for the weighted average strategy

Sequence_classification_train_wa: trains the classifier.

Sequence_fuzzy_classification_apply : applies the classifier.