CONCEPTION ET SIMULATION

FOSTER : Fouille de données spatio-temporelles - application à la compréhension et à la surveillance de l’érosion

Objectifs

- Collaborative and active methods to data mining
- Image time series and spatio-temporal data analysis
- Applications to study of erosion process and landslide
  - Validation with experts and users
- Valorization and integration :
  - Qēhnelō (Bluecham) and MUSTIC (Icube) platform

Input data : multi-resolution images of Barcelonnette basin (Alpes de Haute-Provence, France)
Step 1 : Landsat TM MR (MS - 30m), Step 2 : Rapideye HR (MS - 5m) , Step 3 : ortho-image VHR (MS – 50 cm)

From data to models: a collaborative segmentation-classification approach to multiresolution analysis

Spatio-temporal patterns : region approach
New pattern domains

Cohesive Co-Evolution Patterns

Groth patterns
Collection of homogenous regions evolving in time

Results landfills of mud

Other patterns

Spatio-sequential pattern

Condensed attributed tree

Weighted paths in directed attributed graphs

Workflow overview of the top-down multiresolution hybrid approach

Ground-truth maps associated to the three datasets

Classification results obtained from the three datasets

Spatio-temporal patterns : pixel approach
New pattern domains

GFS patterns

The Grouped Frequent sequential (GFS) patterns are pixel evolutions extracted under anti-monotone constraints: pixels affected by such a pattern must be numerous and connected enough. These patterns can be sorted using the normalized mutual information.

Results on Landsat image series New Caledonia
(6) lake affected by infiltration of mud and drought
(5) water affected by infiltration of mud and drought
(4) mining areas
(3) tanks of mud
(2) lake affected by infiltration of mud
(1) nursery of reforestation
(0) low

Temporal sequences classification

- Using DTW and DBA

Classification of contextualized pixels

Before the clustering, in temporal sequence, for each date, information about the segment to which the pixel belongs is added. All the other steps are the same.

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