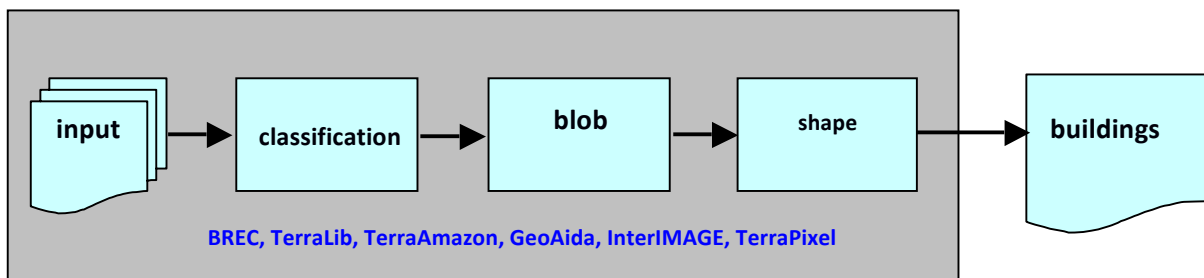


## WP4 - HUEX

### Original HUEX Processing chain

The original design of the processing chains useful for the ERVU tool corresponded to the following four series of processing blocks.

#### *First processing tool: Building extraction I*



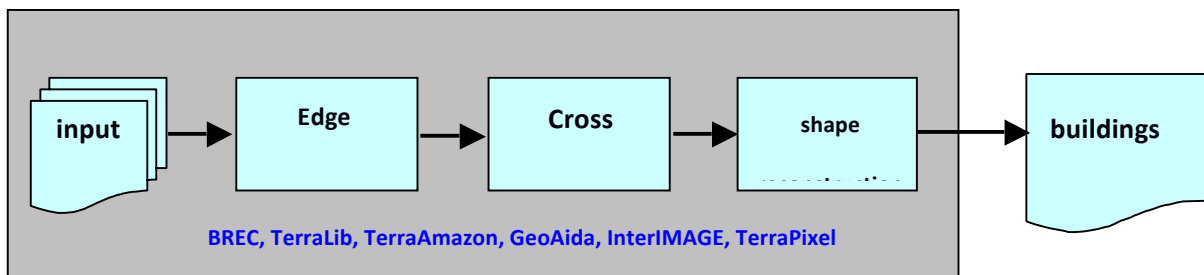
Description of the steps:

“Classification” step: a supervised or unsupervised classification algorithm.

“Blob remover”: an algorithm to select “group of interconnected pixel” which size falls in a selected range.

“Shape regularization”: double step algorithm aimed at improving building geometrical regularity.

#### *Second processing tool: Building extraction II*



**BPFC Toolkit Toolchain - CoAide**

Description of the steps:

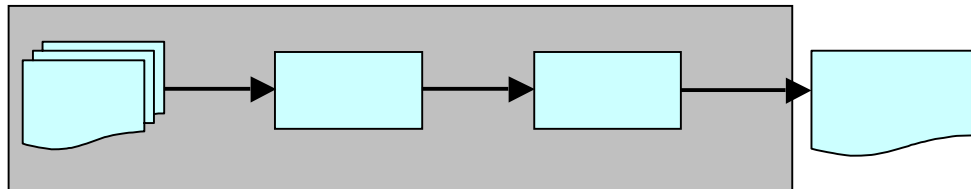
“Edge extraction”: a routine able to extract edges form both Optical/SAR data.

“Cross detector”: an algorithm to select intersection from the extracted edges pool.

“Shape reconstruction” is divided into two main algorithms: Building reconstruction and Building regularization.

The first algorithm receives as input the extracted edges and their intersections, and tries to reconstruct rectangular building shapes using parallel segment pairs. The second algorithm looks for the best fitting rectangle for each object, provided a sufficient similarity between the original object and the regularized rectangular shape is maintained.

**Third processing tool: Floor extraction:**

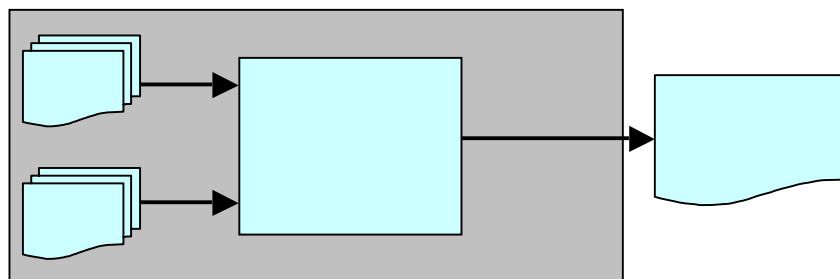


Description of the steps:

“SAR edge extraction”: the same algorithm used in the previous chain for chain extraction

“Floor detection”: an algorithm to select parallel edges from the extracted edges pool trying to identify potential “floor edges”.

**Fourth processing tool: Identification of roof materials**

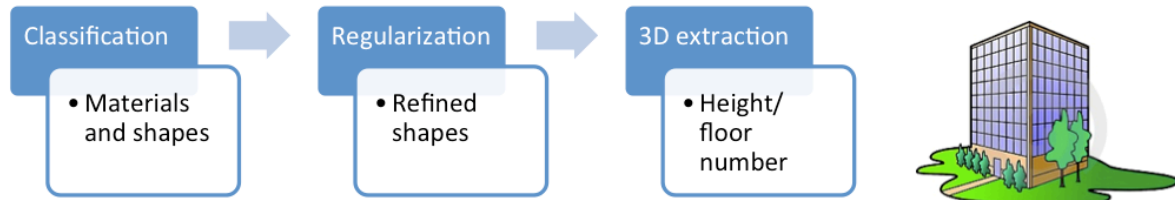


Description of the steps:

“Roof classification”: a supervised classification tool, assuming that existing area identifying roofs are available.

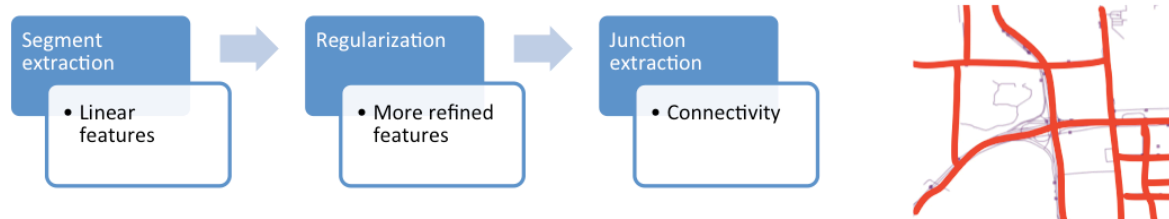
## ERVU version 1 implementation (May 2013)

The implementation in the first version of the tools focused on developing the first and fourth chains, based on segmentation and building regularization. The overall chain was eventually completed including the previously mentioned algorithms, all of them already developed in BREC and integrated in InterIMAGE as external operators.



## Improvements in ERVU version 2 (May 2014)

The second version of the tools focused on developing the second and third chains, based as for the first version on segmentation and building regularization. As for the first version and the previously mentioned tools, a single processing chain was eventually completed including all the required algorithms, already developed in BREC and integrated in InterIMAGE as external operators.



## Improvements in ERVU version 3 (November 2014)

The third and final version of the tools focused on The optimization of the two developed chains, by allowing the possibility to run the chains in batch mode in InterIMAGE either partially or saving at any step the intermediate results for possible re-use.