The IQmulus Processing Contest

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What's the IQmulus Processing Contest?

- Aim:
  - enable **reproducible** evaluation of the performance of geospatial data processing
  - create **benchmarks** and evaluation methodologies
- Target services:
  - point cloud registration and alignment
  - feature extraction, classification, and detection
  - characterization of dynamic events
- The IQmulus Processing Contest provides
  - a selection of test **datasets** with a ground truth;
  - a **platform** where the participant will be able to run their methods in a unique and standard infrastructure;
  - uniform **evaluation** criteria and methods.
- The IQmulus contest is featured by the EU IQmulus project (http://www.iqmulus.eu/)

The IQmulus Processing Contest

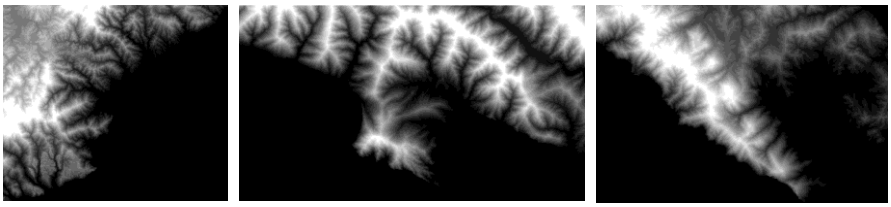
- Two tracks are currently running
  - Feature extraction: drainage basins
    - Three participants (four methods)
  - Point cloud registration
    - Six participants (three outside of the consortium), six methods

The IQmulus Processing Contest

- For each track, the salient/crucial points are:
  - The creation/selection of the datasets
  - The creation/definition of a ground-truth
  - The definition/identification of evaluation measures
    - Quantitative measures: time, memory occupied
    - Qualitative measures: quality of the registration, average error, deviation, accuracy of the features detected, etc…

Feature extraction: drainage basins

- 3 datasets extracted from DEM provided by Regione Liguria (owner Ministero dell'Ambiente, Italy)
  - the ground truth is the official map of the drainage basins owned by Regione Liguria

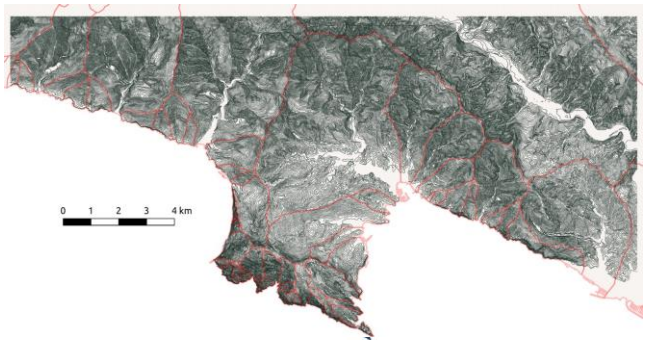


Feature extraction: drainage basins, first results

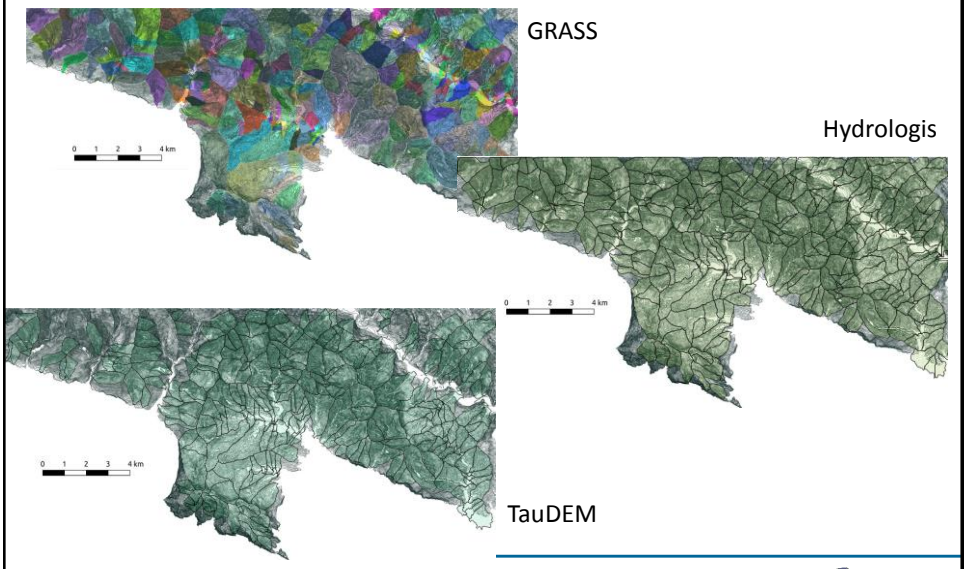
- The results of three popular methods are available (Hydrologis, GRASS, TauDEM)
  - Each participant was required to submit up to three runs with different parameters

Portofino's area

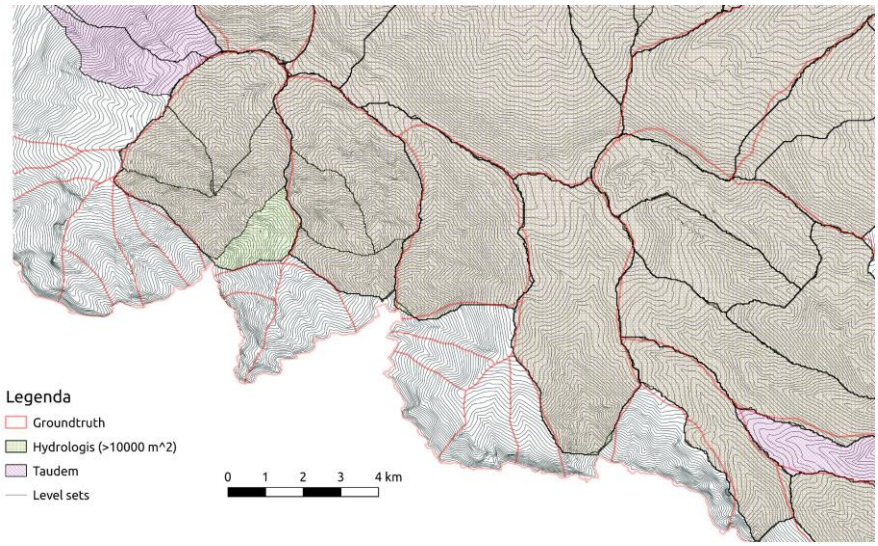
Ground truth



Some outputs



Visual comparison



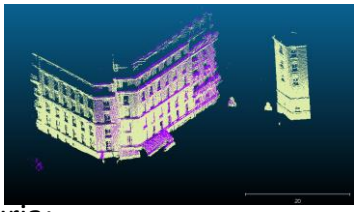
Feature extraction: drainage basins, first results

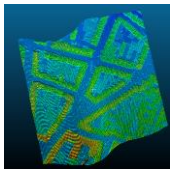
- Comments:
  - TauDEM follows a multiscale/hierarchical approach, it is more time consuming
  - Hydrologis and GRASS detect basins at a unique scale, GRASS run really fast

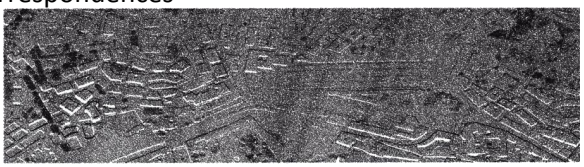
Method	Time	Small (< 1 km²)	Medium (< 5 km²)	Large (>5 km²)
GRASS	<6 secs	XOR	XOR	XOR
Hydrologis	na	XOR	XOR	XOR
TauDEM	~1 min	AND	AND	AND

Registration track

- 6 datasets
  - 4 datasets provided by IGN
    - the ground truth is known
  - 2 datasets originated from airborne Lidar scans provided by Regione Liguria; Gaussian noise is added, the point clouds are rotated and non-uniformly filtered
    - the ground truth is the original dataset with the record of the correspondences

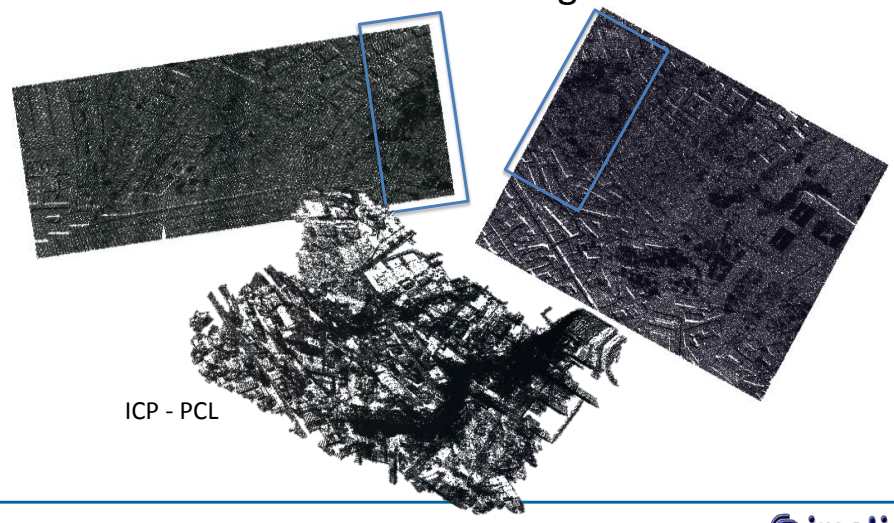






Registration track: first results

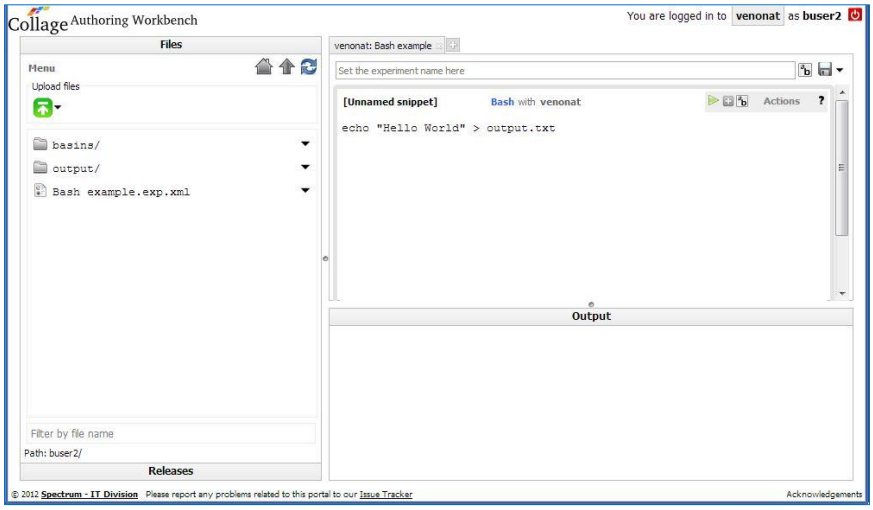
- Some methods are still running



Do you want to familiarize with the contest?

- It is accessible at http://collage.ge.imati.cnr.it/workbench
- Sign-in to the infrastructure by sending an email to silvia@ge.imati.cnr.it
- We set up a common infrastructure/environment: *The "Collage Authoring Workbench"* to access via http protocol
  - It is possible to upload your own executable, to select the input/output files and to run it with a «simple» script
  - Several interpreters (e.g. batch, octave, wine, gnuplot, etc) are available
  - The output is a .xml file with a «doi» that can be made publicly available and linked to (other) webpages

Collage Authoring Workbench



The IQmulus Processing Contest

- Future plans:
  - Shortly, we'll made available the report of the results at http://www.ge.imati.cnr.it/iqmulus_contest
  - New track proposals:
    - Feature extraction
    - Reconstruction from airborne Lidar scans
    - …

IQmulus

Thanks for your kind attention!

more information at:
http://www.ge.imati.cnr.it/iqmulus_contest

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