

DGtal: Digital Geometry Tools and Algorithms

<http://liris.cnrs.fr/dgtal>

The DGtal Team

DGtal Meeting, September 2011

DGtal



UMR 5127

DGtal : why, who

Objectives

- to make easier discrete geometry for the neophyte (student, researcher from another field, ...)
- to test quickly new ideas, with objective comparison wrt existant works
- to make easier the implementation of demonstrators
- to help spread our research results to other domains
- to pursue a federative project

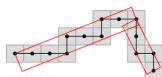
Who ? for now ...

- LIRIS (Lyon)
- Gipsa-lab (Grenoble)
- GREYC (Caen)
- LAMA (Chambéry)
- LORIA (Nancy)

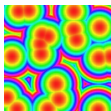
DGtal : what for ?

Main features

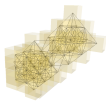
- to define digital objects in arbitrary dimension
- to propose algorithms for topological and geometric analysis
- to provide I/O mechanisms and visualization tools



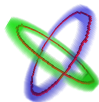
DSS



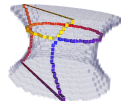
DT



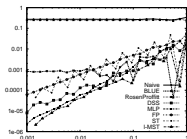
Objects



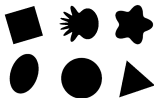
Thinning



Cellular model



Estimators



Shape DB



Contours

...

Design principles

- Genericity and efficiency : C++ library, concepts
- LGPL or GPL with restrictions
- user friendly, not necessarily kernel-developer friendly

Kernel

Basic types, data structures

- digital space, point, sets, lin. algebra
- software infrastructure : trace, concept validation, ...

Images

- generic container
- several implementation : standard, other adapted to big images

Base modules

Topology module

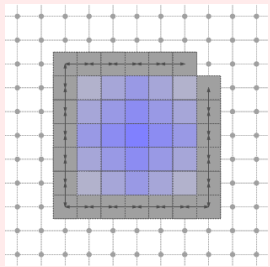
- digital topology : connectedness, border, simple points
- grid topology : cells, contours, surfaces, tracking

Geometry module

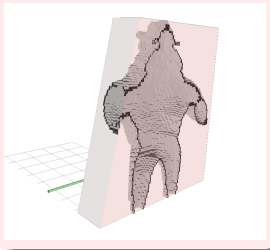
- primitives, DSS recognition
- contour analysis : decomposition, convexity, estimators
- volumetric analysis : area/volume, distance transforms, medial axis

Other modules, or modules with external dependencies

2D, 3D/2D vector export
(PDF, SVG,...)



3D visualization



Backends

- Kiteware's ITK
- VIGRA (soon)

Import/export

- images (ImageMagick)
- volumes (libvol)

Project modules

- noisy objects (GeoDIB)
- ...

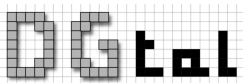
DGtal Roadmap

New in milestone 0.4beta (now)

- Kernel update : refactoring of the kernel classes
- 2D, nD-volumetric geometry : geometric estimators, easy multigrid analysis
- 3D visualization with QGLviewer
- Easier use of streams for vector export (with libBoard and Cairo)
- grid or interpixel topology : cells, digital surfaces, surface tracking
- implicit/parametric shape factory
- Infrastructure : git repository and github project management system, better cmake scripts

Join DGtal

- new contributors are welcome (new bug-reporters, documentation readers are welcome too)
- collaborative forge, development infrastructure



<http://liris.cnrs.fr/dgtal>



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X. Provençal



B. Kerautret



S. Fourey



I. Sivignon

Program of the tutorial day

- 9h accueil
- 9h30 DGtal Overview, How to download and install DGtal ?
- Kernel Introduction (David)
- 10h30 Digital Domains (Guillaume)
- (break)
- 11h00 Digital Topology & Khalimsky spaces (Jacques-Olivier)
- 12h00 lunch
- 13h30 Streams, visualization, ... (Bertrand)
- 14h30 2D geometry (Tristan)
- 15h00 Volumetric geometry (David)
- 15h30 2D estimators (??)
- (break)
- 16h00 DGtal tools (demo, Bertrand / David)
- 16h30 Discussions
- 17h30 The End