Master 2 "SIS" Digital Geometry

ASSIGNMENT 3:
TANGENT ESTIMATION OF DISCRETE SHAPES

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Assignment subject and preparation

Subject

Implement the λ-MST estimator for discrete shapes with a help of the C++ library DGtal.

Your can also make codes (in C, C++, Java, etc.) without using the DGtal library. Please ask if your chosen language can be allowed before starting coding.

Implementation and experiments

1 Generate Euclidean shapes (disk, ellipse, triangle, etc.) or Euclidean curves (line, circle, conic, trigonometric curves, etc.) and discretize them,

2 Make *m*-curves from their discretization (extract their contours if the inputs are Euclidean shapes)

(The following module and pages may help: Section "Tracking, grid curve, range" in http://libdgtal.org/doc/stable/tutoShapeGridCurveEstimator.html)

3 Generate all the maximal segments of each *m*-curve and visualize them,

(The following module and page may help: SaturatedSegmentation, http://libdgtal.org/doc/stable/geometry2d.html)

4 Calculate a λ-MST (maximal segment tangent) direction at each curve point by using the symmetric triangle function $\lambda(t)$ for $t \in [0, 1]$ that gives null when $t = 0, 1$ and the peek 1 when $t = \frac{1}{2}$,

5 Compare them with the true tangent directions by plotting the estimated and true directions together (see page 24 of the 5th lecture slide or figure 15 of J.-O. Lachaud, A. Vialard and F. de Vieilleville, "Fast, Accurate and Convergent Tangent Estimation on Digital Contours", Image and Vision Computing, Vol. 25(10), pp.1572-1587, 2007.

This paper can be found at http://www.lama.univ-savoie.fr/ lachaud/Publications/LACHAUD-JO/publications.html

Practical information

- **Code and report submission and deadline**: November 23, 2012
  (send a compressed file by mail with the title of "assign3 of DG")
- **Grading policy**: 20% of 50% for all the assignments
- **Evaluation environment**: Linux ubuntu (This means that your
  program will be compiled and ran with a linux environment for its
  evaluation, without any special setting.)
- **Note**: Please attach with your code a **makefile**.