Project 3 : Segmentation using Voronoi diagrams

1 Goal

Try to (partially - see below) reproduce the 2D results of `http://www.cse.ohio-state.edu/ tamaldey/segmentation.html`. Build upon the Voronoi diagram project.

2 Requirements

Start by computing the Voronoi diagram of a set of points (in this case, the points won't be random but will form an outline of a nice curve, like a 2D drawing of something), using your (yes, it has to be the same as your 'core' project submission) project code. Grab the image (there is an OpenGL command for this). Later on, you'll use the colors to quickly figure out in whose Voronoi cell a point is.

Now, imagine that the pixels start escaping from the nearest site by jumping 1 unit (say, pixel size) away from it. Follow a large number of jumps (each time, look up the nearest site using the Voronoi diagram image). Do the same for all (or a lot of randomly chosen) pixels. If a pixel jumps out of range (window used in the Voronoi diagram calculation), it dies. The escaping pixels should eventually concentrate around a small number of points ('attractors'). Figure out these attractors, assign unique colors to them and color their 'basins', i.e. all pixels which escape to the same attractor, using the corresponding color. Come up with a heuristic allowing to figure out which basins are the 'external' regions to the curve.

3 Deliverables

Prepare a web page with screenshots, source code (it has to obey the usual rules, in particular compile on the lab machines undel linux) and a short description of how things were implemented. Test your code on a few input point sets (draw them yourself or find somewhere on the web). Also, show one or two examples where your algorithm does not produce expected results and explain why. By submitting this web page, you agree that a link to it will be posted on the class web page.

To get credit, your code needs to do reasonably good job finding/drawing the basins of attraction and be able to figure out which of them are external for not-too-tricky inputs.