

Report

Voronoi Diagram, Power Cells and Fluid Simulation

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CSE306 - Ecole polytechnique, Bachelor of Science - SS20

files and folders

- `main.cpp` simple driver
- `main.h` the actual code
- `incl/` libraries to be include (lbfgs, nanoflann, stb)
- `pics/` outputs
- `report.pdf` = (pdf)*this

sections

`main.h` is splitted into several sections: - `convex power cell`: cells are polygons centered in their seed, and constructed by repeatedly adding points - `random stuff`: several functions to sample points, and Lloyd's algorithm is implemented in `social_distancing` - `dell optiplex`: lbfgs callbacks to compute weights for given parameters - `petri dish tasting`: power cell diagram with food in the center - `enter the simulation`: fluid simulation - `messy details`: cell's `add_pt` `area` `inertia` `centroid` and `get_diagram` with neighbour search (nanoflann) optimization - `taking pics`: render to svg and png

other features

- parallelism: because why not
- stills to animation: `make animate`

external resources

- `incl/stb_image_write.h` writing to png STB library
- `incl/nanoflann.hpp` KDTree nanoflann library
- `incl/libfgs.*` `incl/arithmetic_ansi.h` optimizer

renders

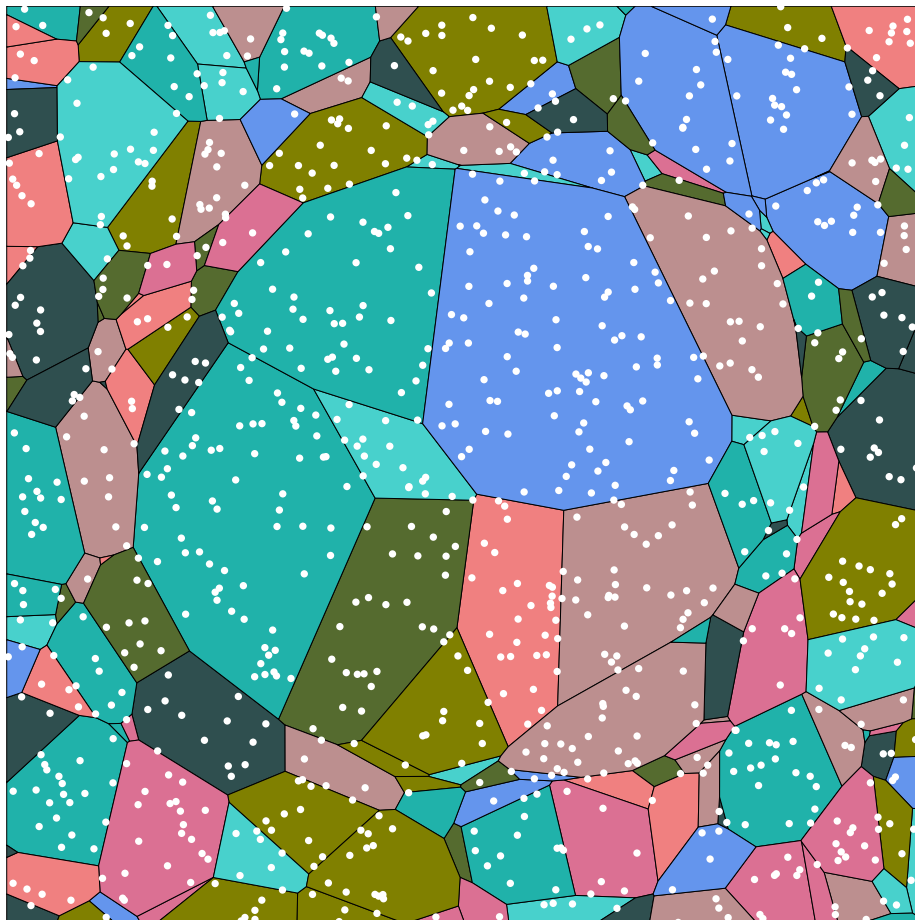


Figure 1: food thing power diagram

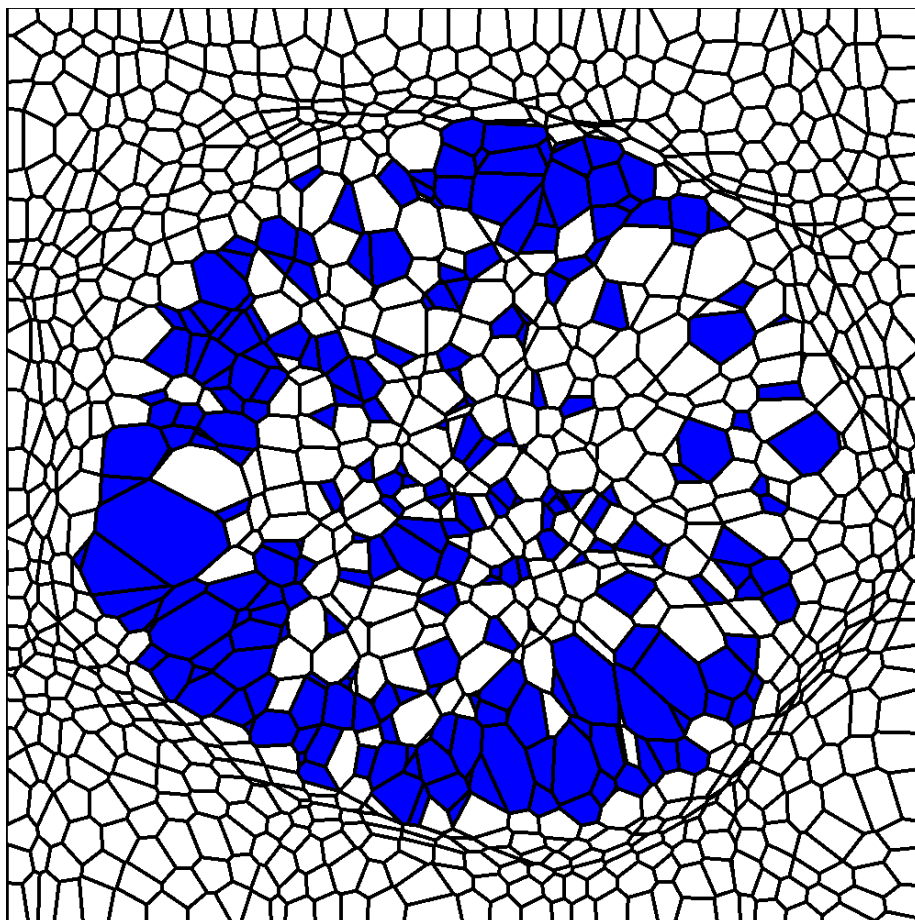


Figure 2: fluid simulation