Adventures in Computational Art: Moving Points Around

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Code is an artistic medium.
All technology is a means of enhancing human capabilities.

Computer graphics is an imagination amplifier.
for( int idx = 0; idx < N; ++idx ) {
    ellipse(
        random( width ), random( height ),
        10, 10 );
}
\[ |F| = \frac{G}{d^2} \]
\[ |F| = \frac{G}{d^2} \]
In every time step:

Calculate all forces on points.
Use forces to update point velocities.
Use velocities to update point positions.

Daniel Shiffman,
The Nature of Code
natureofcode.com
\vec{v} = (v_x, v_y)
\[ \vec{v}' = (-v_x, v_y) \]

\[ \vec{v} = (v_x, v_y) \]
\[ \vec{v} \cdot \vec{f} \]
$O(n^2)$
Voronoi Diagram
New (non-physical) simulation:

Construct Voronoi diagram. 
Move each point to the centroid of its Voronoi region. 
Repeat until points stop moving.

AKA Lloyd’s Method
Weighted Lloyd’s Method
Weighted Voronoi Stippling
[Secord 2002]
The Travelling Salesman Problem (TSP)
[Bosch and Hermann, 2004]
Area Voronoi Diagrams

[Hiller et al., 2003]
Thank you!

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