

ALGORITHMS FOR VORONOI DIAGRAMS

INCREMENTAL ALGORITHM

Add sites one by one, updating the Voronoi diagram for each new site. ↪ discussed last time

Complexity:

- Add n sites.
- To update the diagram when adding a single site
 - Find region containing the new site — $O(n)$
 - Construct edges for the new Voronoi region — $O(n)$
 - remove interior edges — $O(n)$

$O(n^2)$

$O(n)$

FORTUNE'S ALGORITHM: $O(n \log n)$

REMARKABLE CONNECTION

Let S be a set of sites in the xy -plane.

Project each site up onto the paraboloid $z = x^2 + y^2$.

Compute the convex hull of the 3D points on the paraboloid.

Take all the downward-facing triangles of the convex hull, and project them back down to the xy -plane.

This yields the Delaunay triangulation of S .

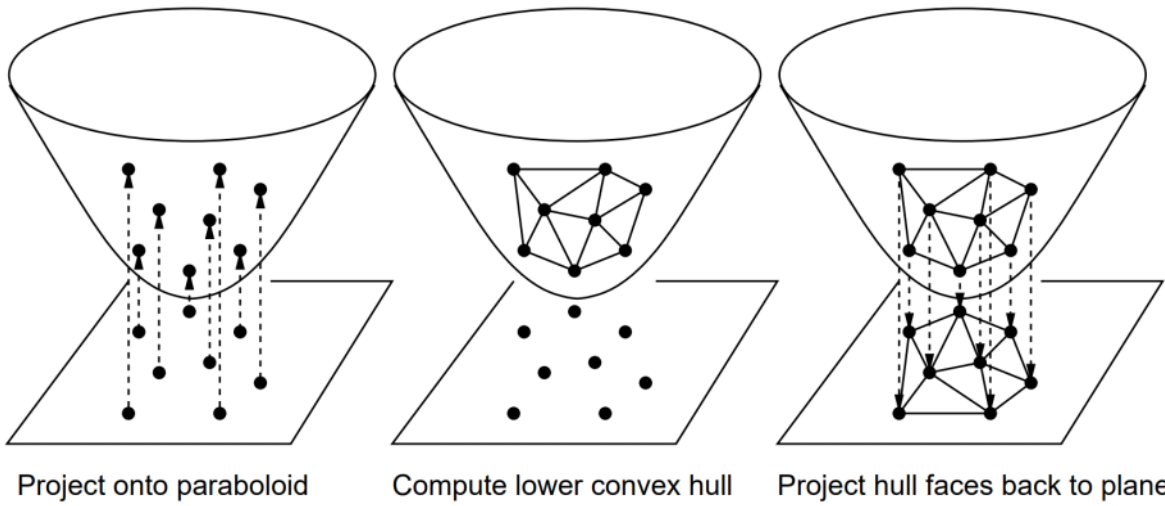


Diagram from: <https://www.cs.umd.edu/~mount/Papers/crc05-prox.pdf>, page 63-11.