Week 12: Scientific Viz

Spring 2017

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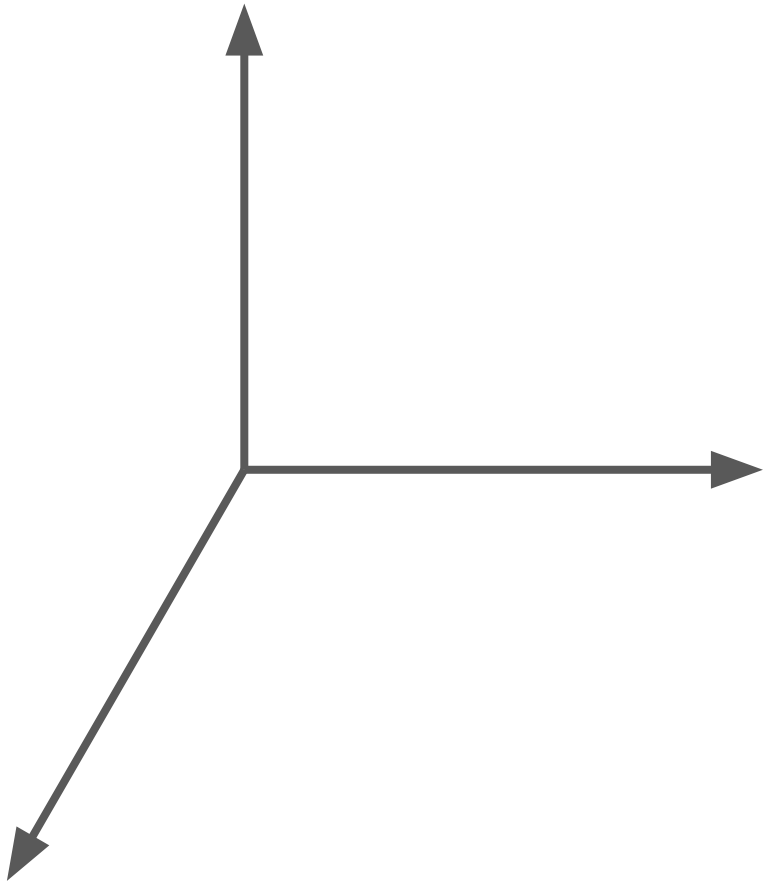
Broadcasting

go.ischool.illinois.edu/meet2

Scientific Viz

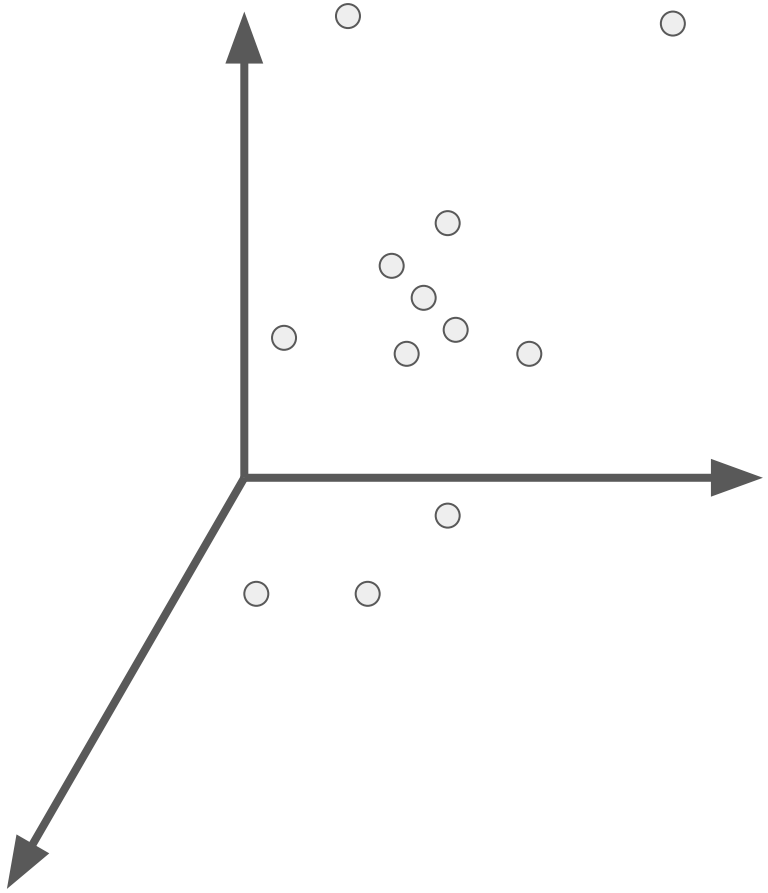
- Spatial organization
- Dimensionality reduction
- Multiple quantities

Data Representations



- Discrete
- Volume-filling
- Mesh

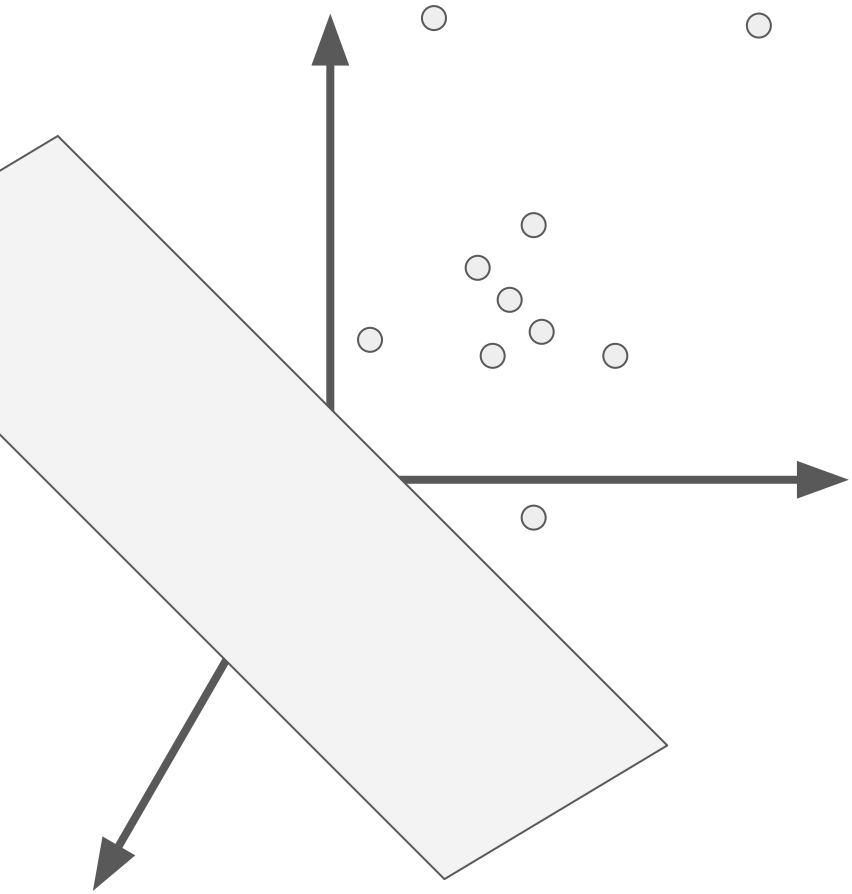
Discrete Points: Data



potree.org

- Associated field values
- *May* have extent
- Values:
  - Locally defined
  - Integral over neighbors

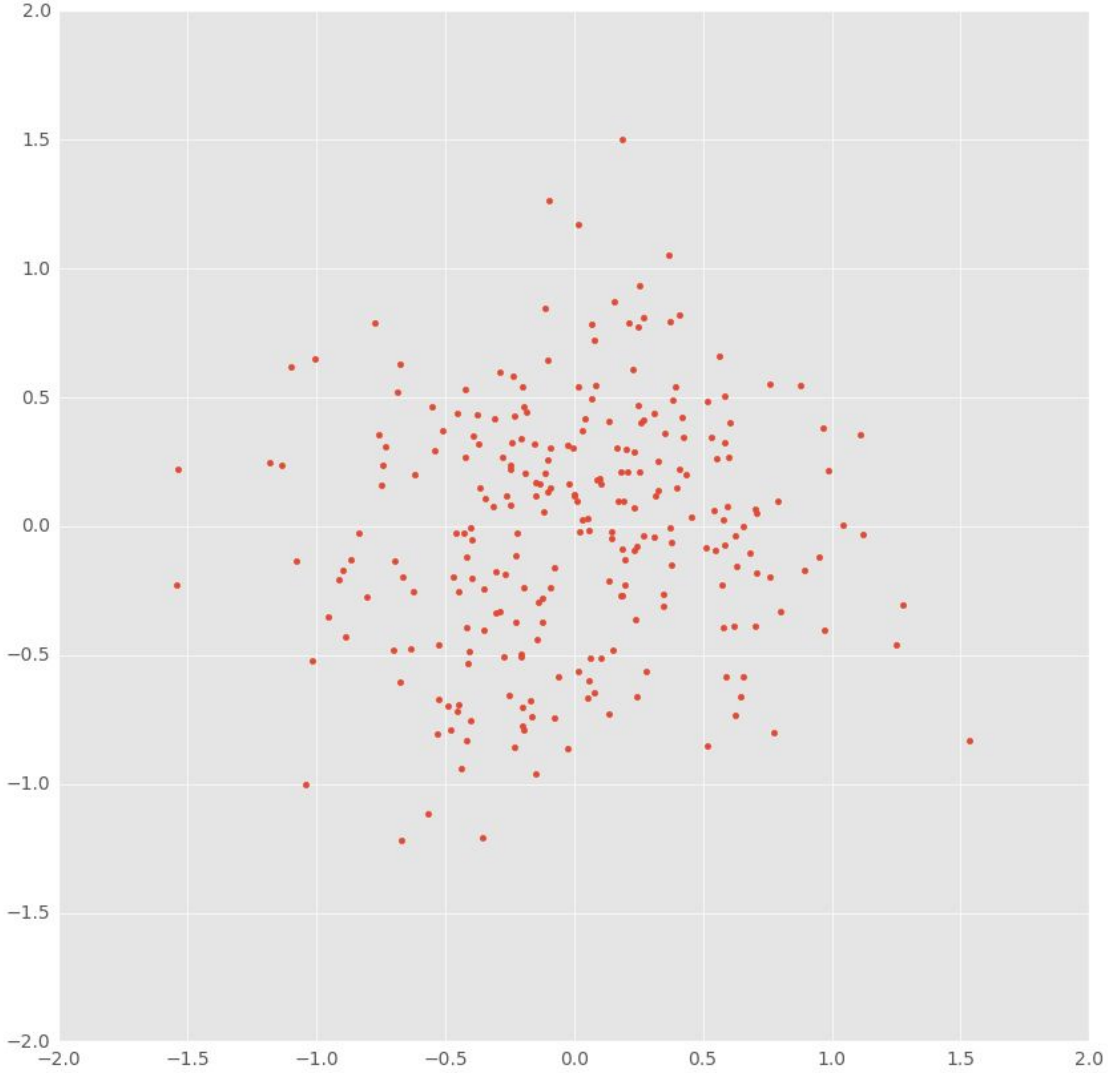
Discrete Points: Techniques



- Projecting onto a plane
  - Gaussian “Splat”
  - Points / circles / patches
- Density estimates
  - Local estimates
  - Adaptive estimates
- Non-Spatial visualization

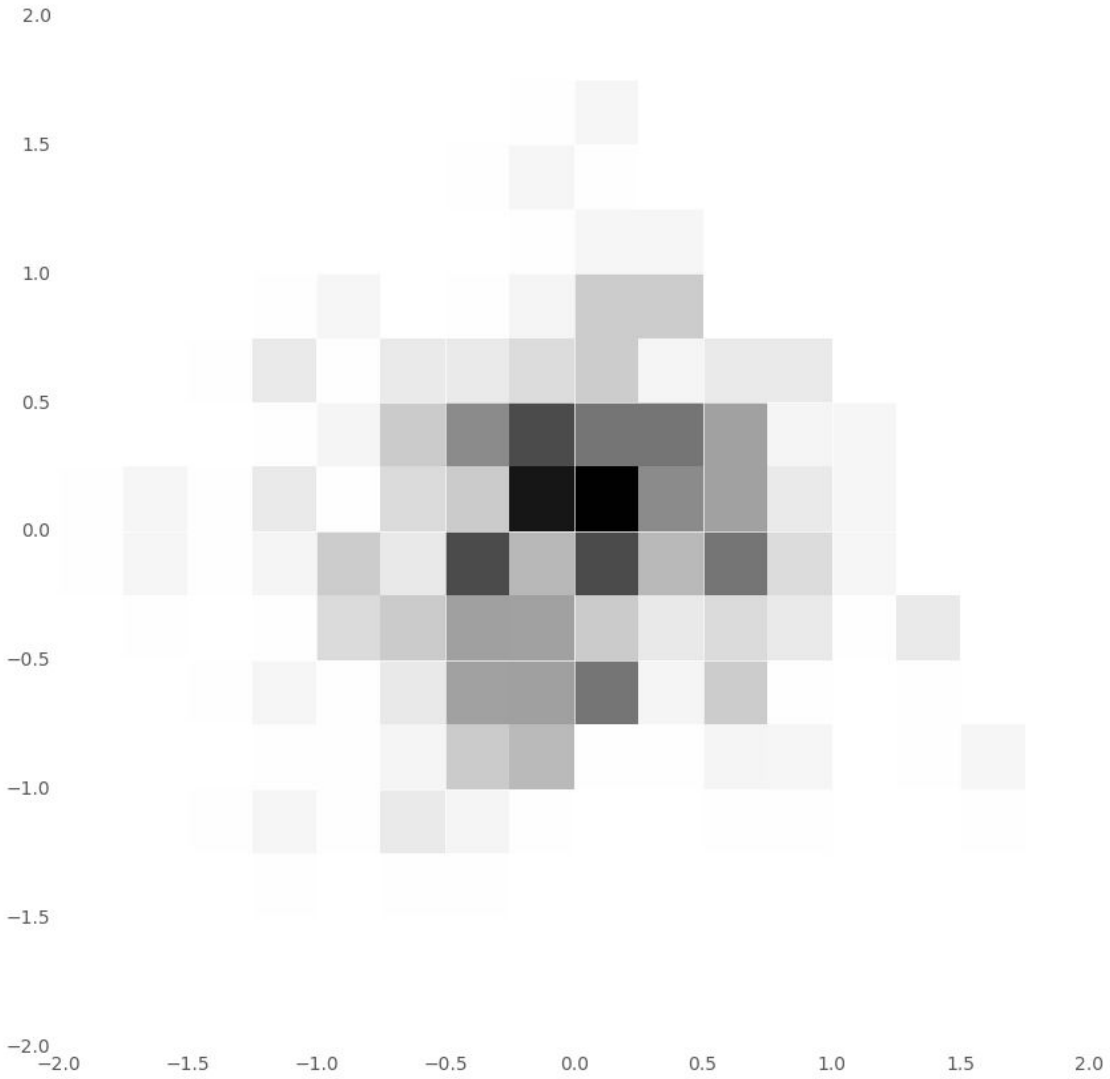
Discrete Points: Density Estimates

Regular
Quadtree/Octree
kD-tree

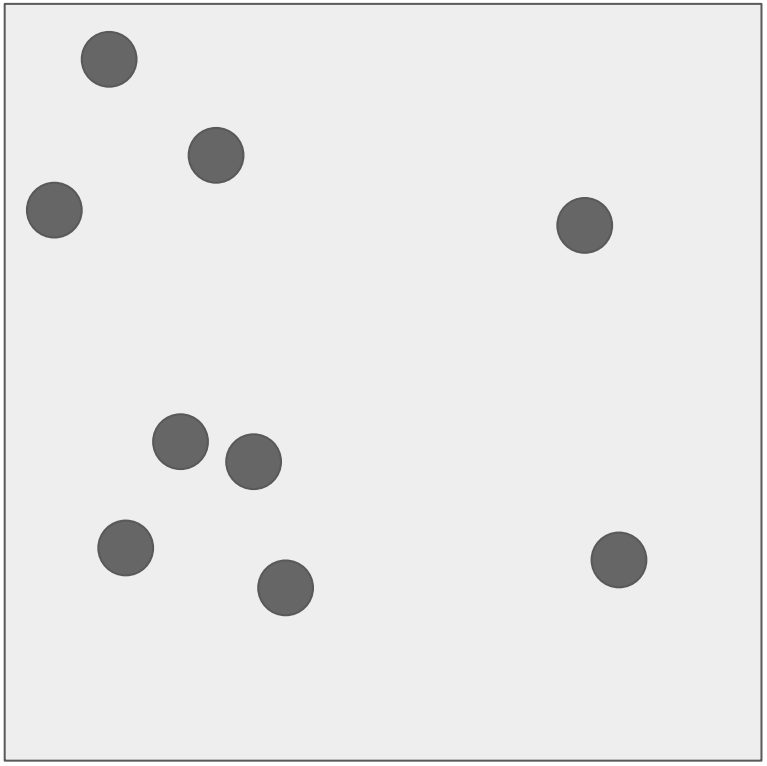


Discrete Points: Regular

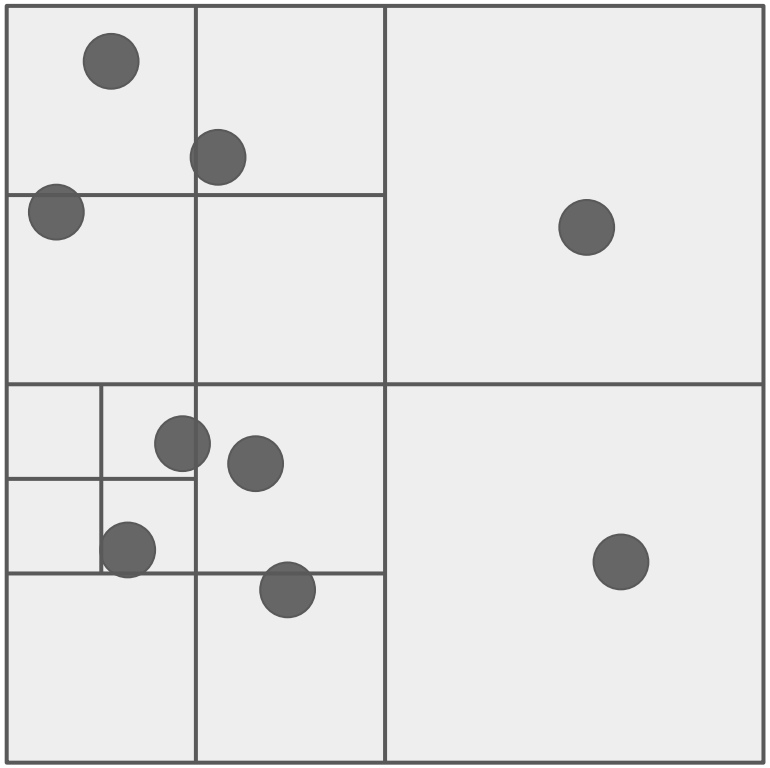
Regular
Quadtree/Octree
kD-tree



Discrete Points: Quad Tree

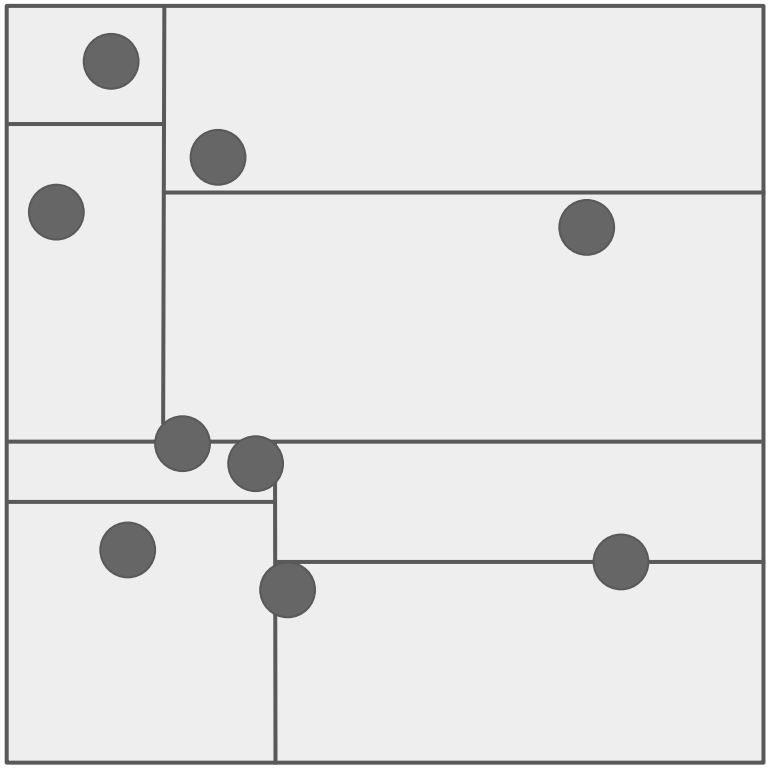


Discrete Points: Quad Tree



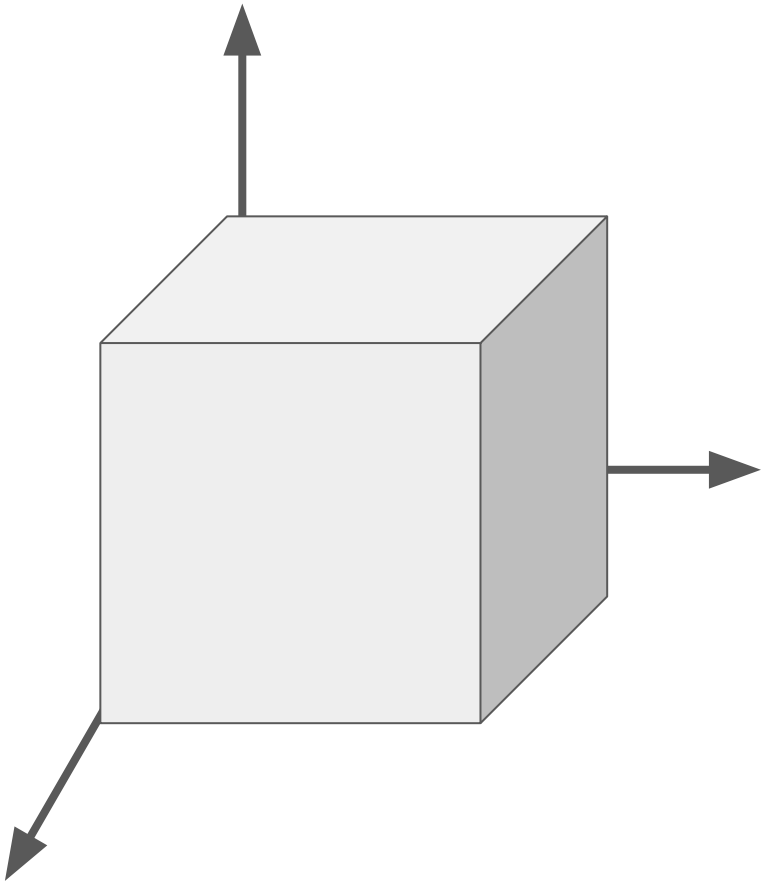
- Simultaneous cuts in x, y
- Not necessarily bisection

Discrete Points: kD-Tree



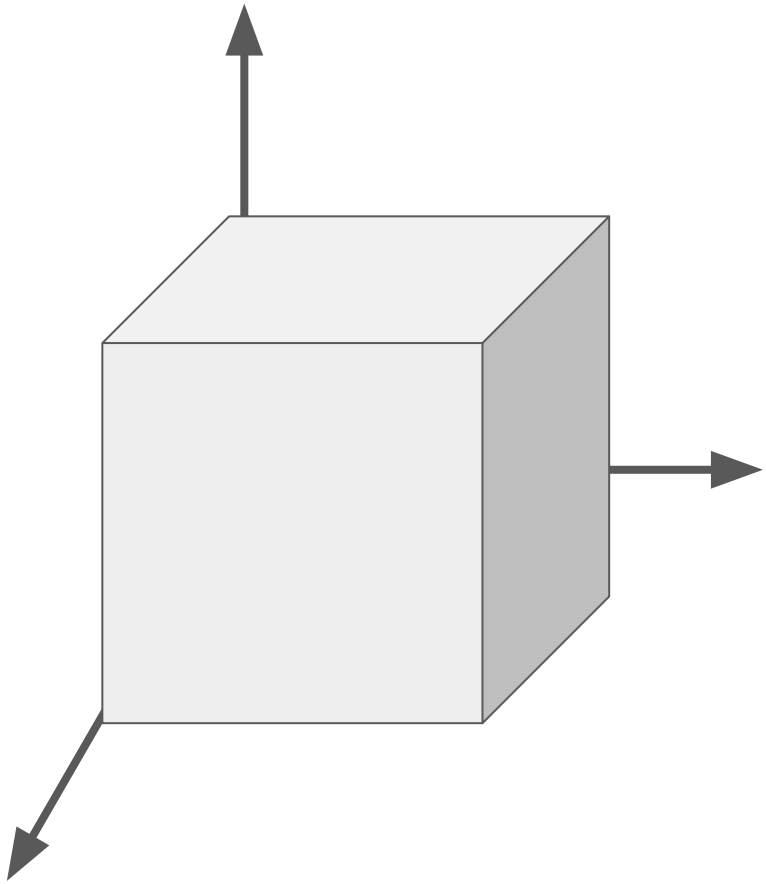
- Bisection
- Cycle through dimensions
- Median or mean

Volume Filling: Data



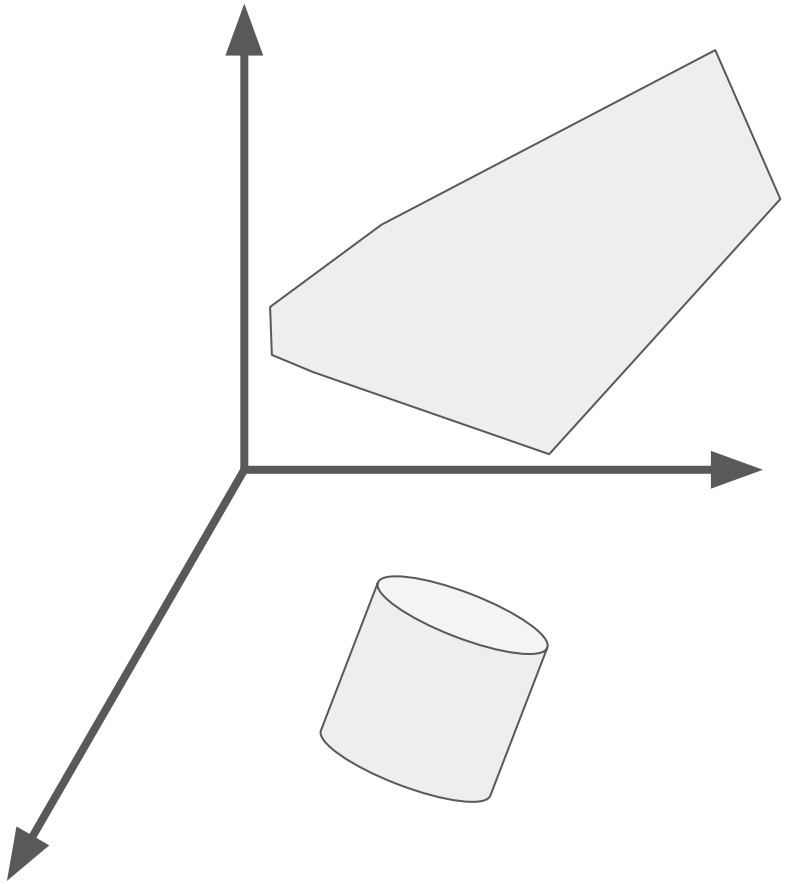
- One or several “values”
- Predictable intervals
- May have multiple in the same domain
- Values:
  - Locally defined
  - Stencil definition (gradient, etc)

Volume Filling: Techniques



- Dimensionality reduction
  - Min / Max / Integral / Sum / Mean
  - Slice
  - Axially-aligned
  - Non-aligned
- Volume rendering
- Segmentation
- Non-spatial visualization

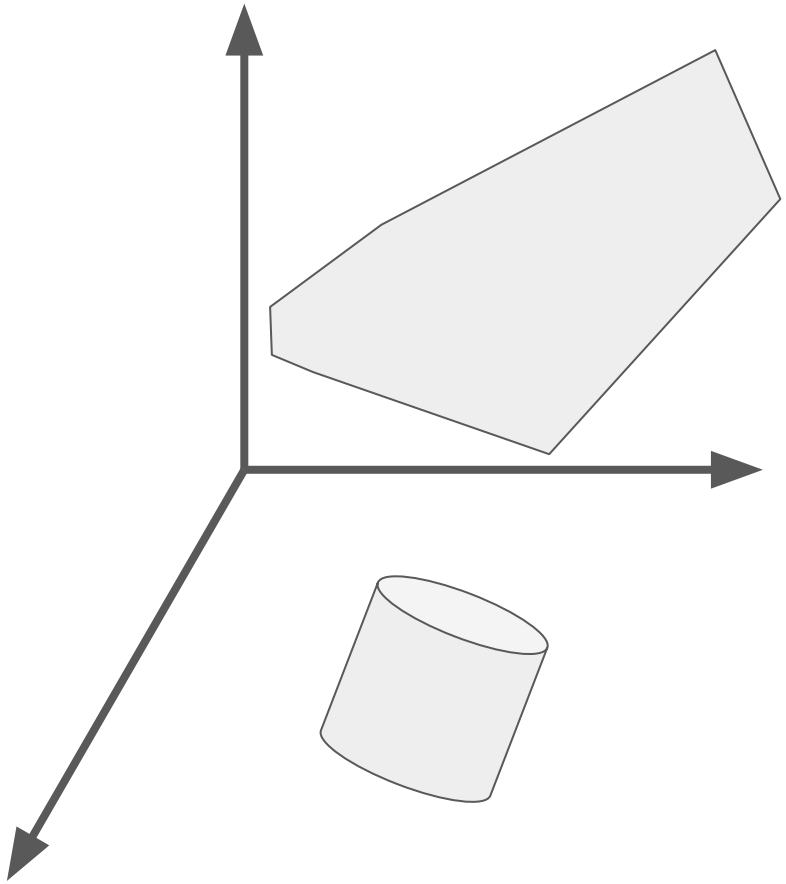
Mesh: Data



- Components
  - Vertices (can be shared)
  - Faces
  - Edges
- Regular structures
  - Hexahedra
  - Tetrahedra
  - Wedges
- Irregular structures
  - Voronoi tesselations
  - Isosurfaces
  - Point cloud reconstructions

sketchfab.com/jnaiman
sketchfab.com/matthewturk

Mesh: Techniques



- Volume rendering
- Slices
- Projections
  - First intersection
  - Accumulation
- Intra-element evaluation

Project: Component 4

- “Infographic” based on component one or component two.
- Tell a story about the data
- You will be graded on:
  - Aesthetics
  - Representation of information
  - Overall presentation
  - Breakdown of information
- Examples:
  - http://www.numfocus.org/annual-reports.html
  - https://www.nytimes.com/interactive/2016/12/28/us/year-in-interactive-graphics.html
- Submission in PDF or website

yt mental model

https://goo.gl/Ct90Dx