

3DSM

Introduction & progress

1st User Committee meeting

Delft, 23 January 2014

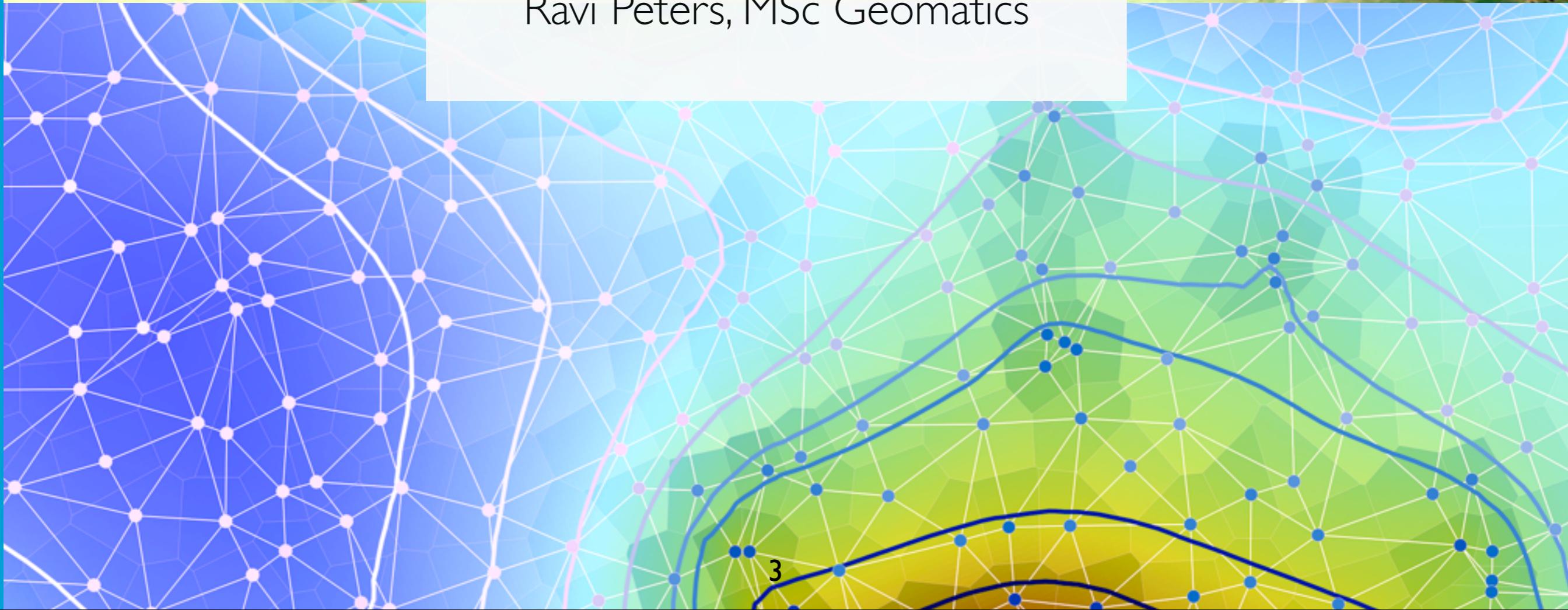
Ravi Peters



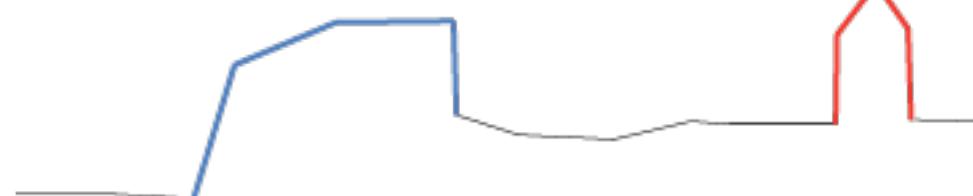
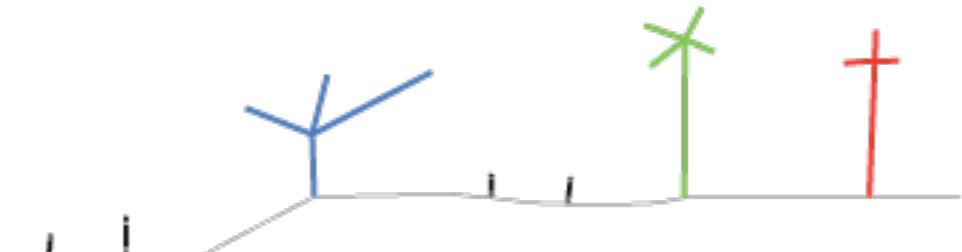
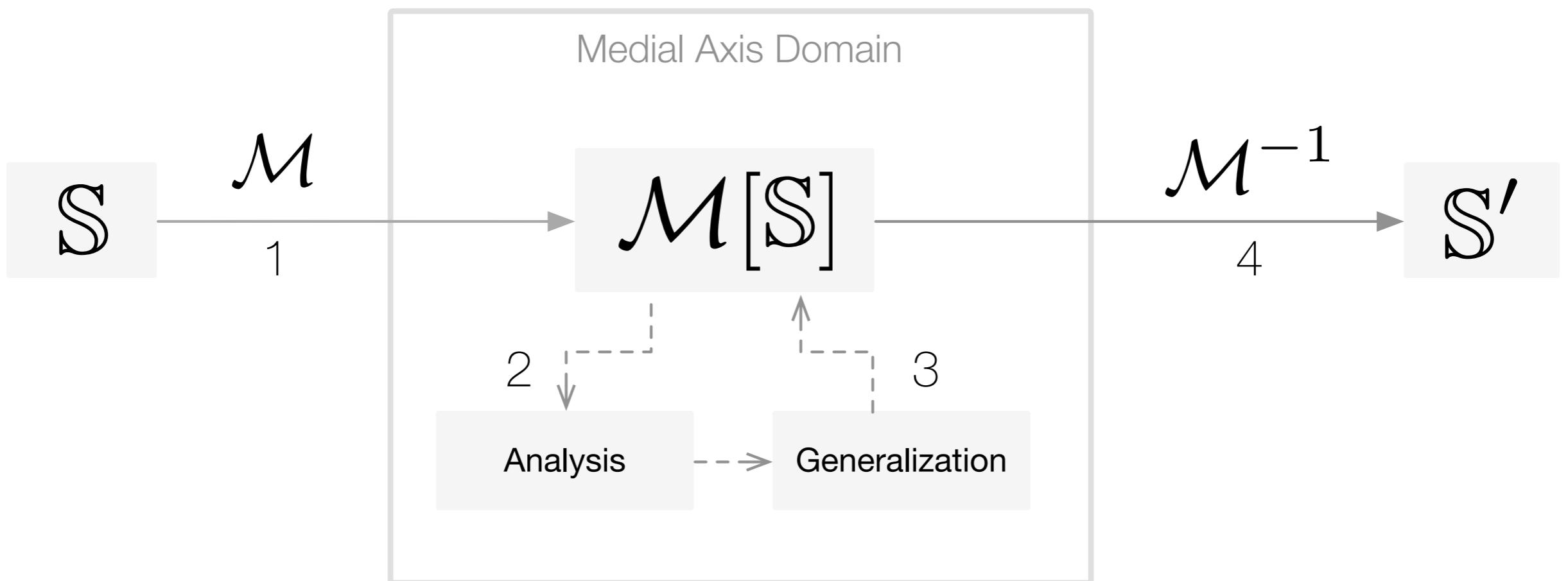
Introduction



Ravi Peters, MSc Geomatics



3DSM overview



Hypotheses

Medial Axis Transform (MAT):

1. enables truly ***3D analysis*** of DSM
2. can be used to effectively ***define features*** in DSM using its ***geometry*** and ***topology***

What kind of features?

Application dependent

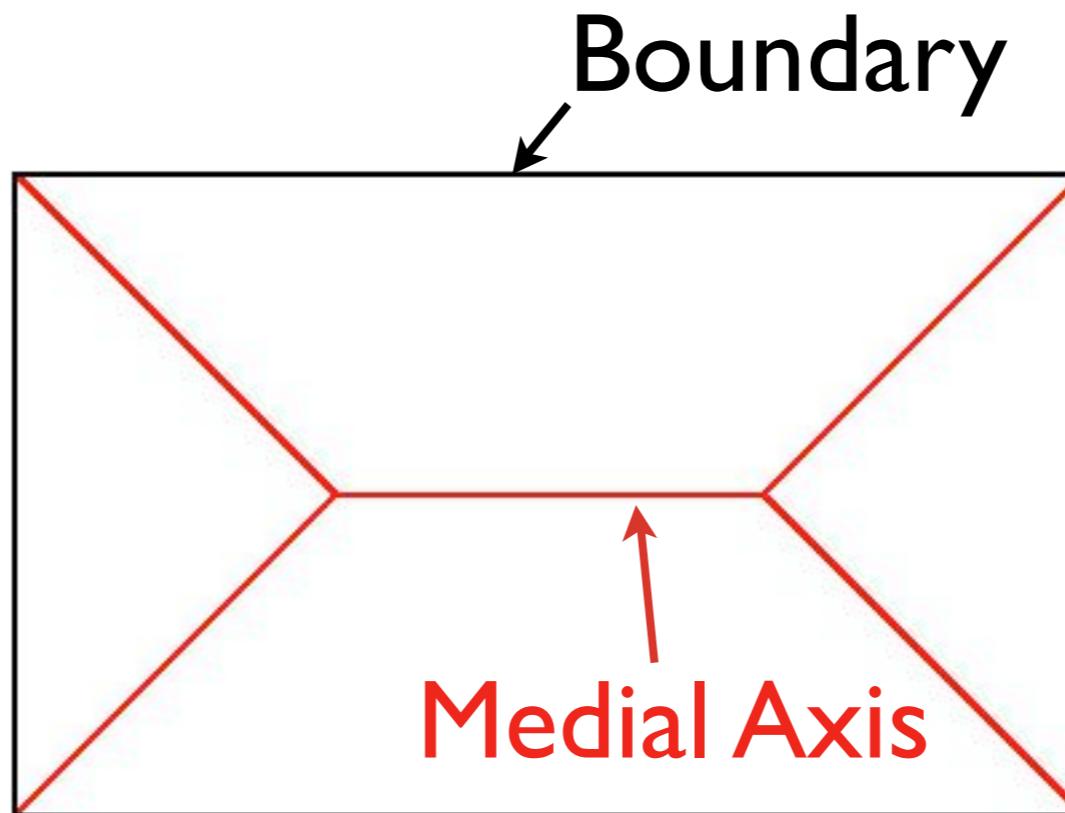
- Characteristic points
- Objects (house, dyke)



Medial Axis Transform

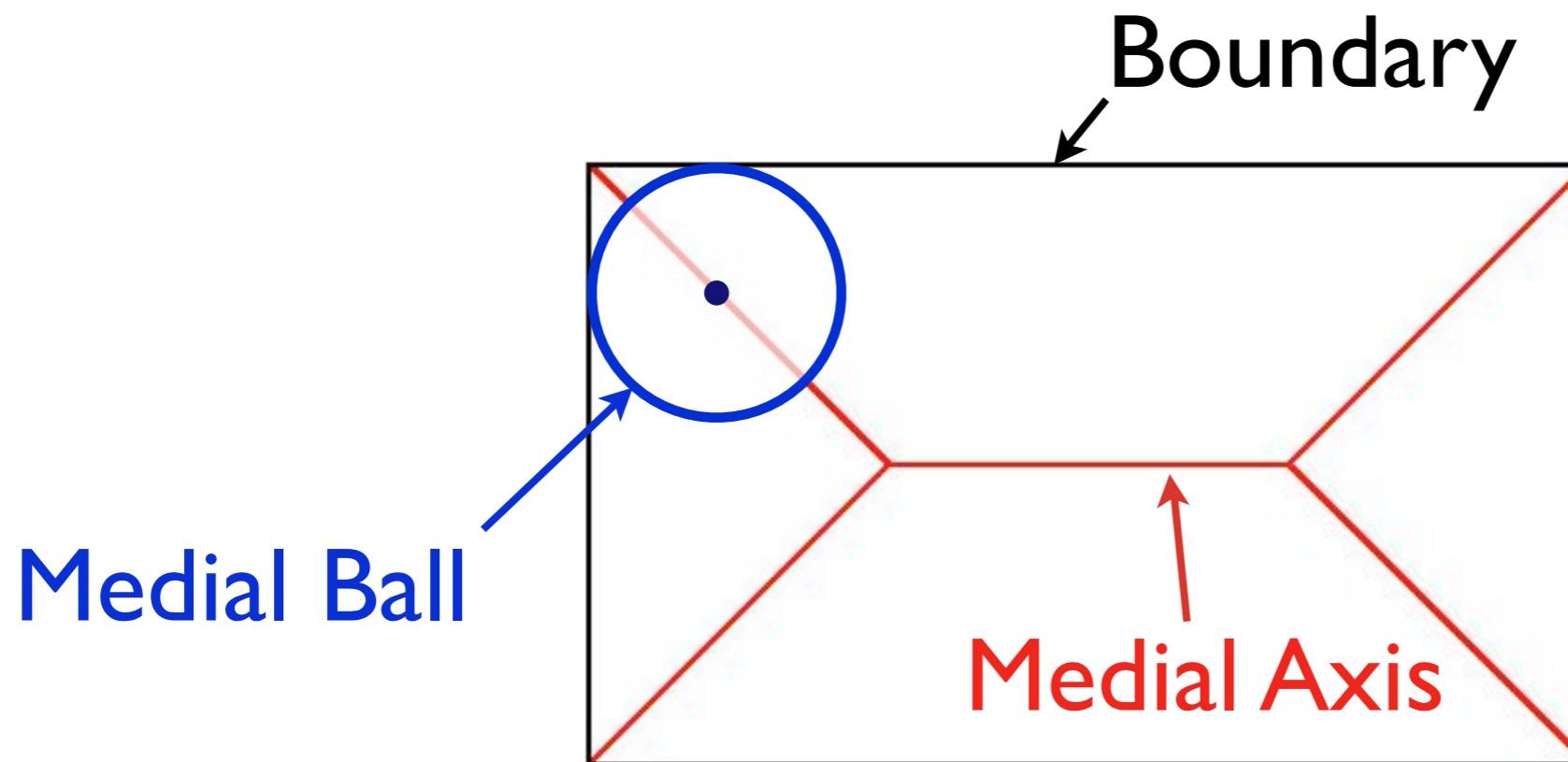
Medial Axis

Set of (interior) points with at least two equally closest boundary points



Medial Axis Transform

Medial Axis + Medial Balls



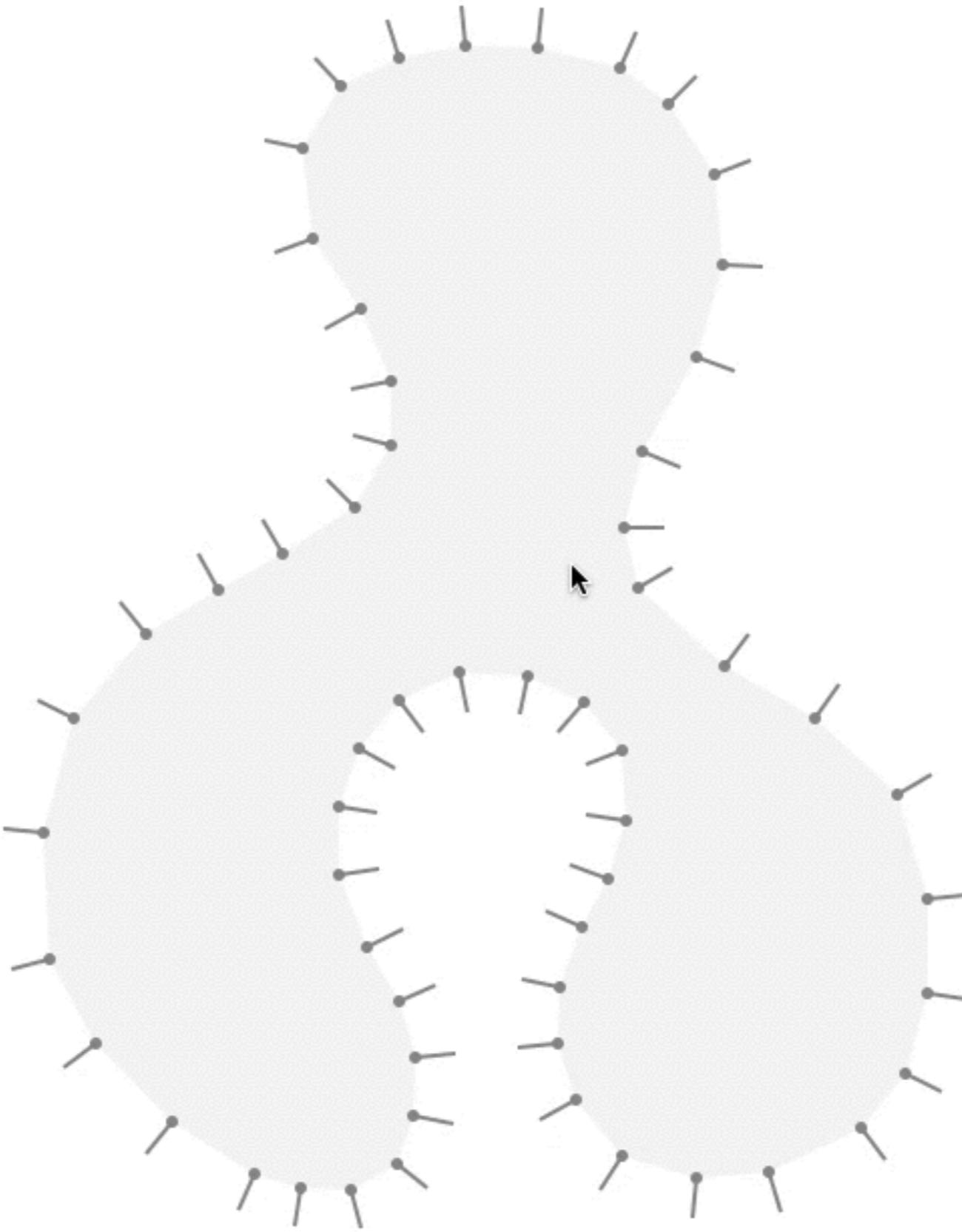
Construction

1. ~~Voronoi based~~
(e.g. Amenta et al., 2001)
2. Voxel-based
(e.g. Chaussard et al., 2011)
3. Shrinking ball algorithm
(Ma et al., 2012)

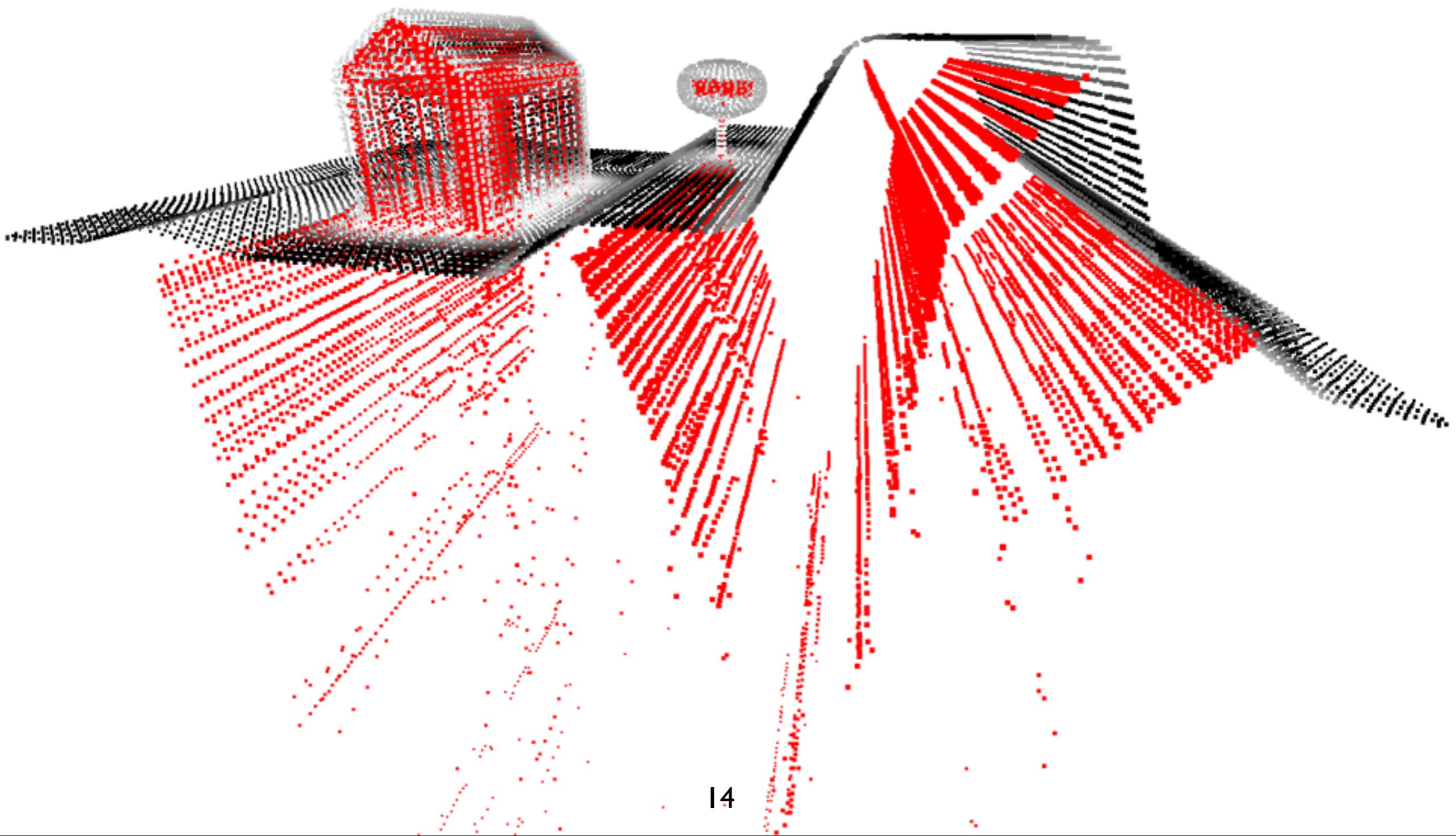




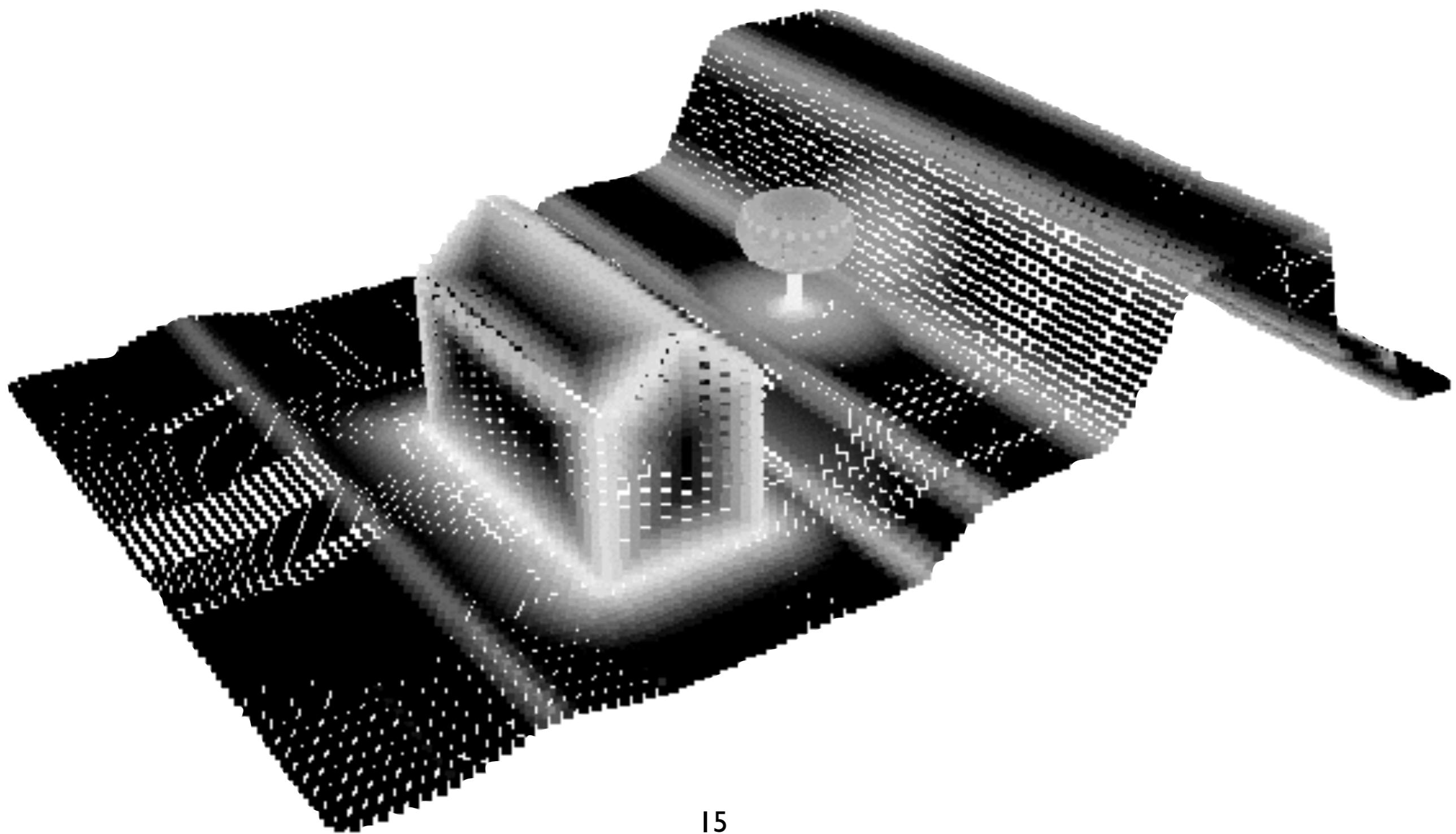
Demo shrinking ball



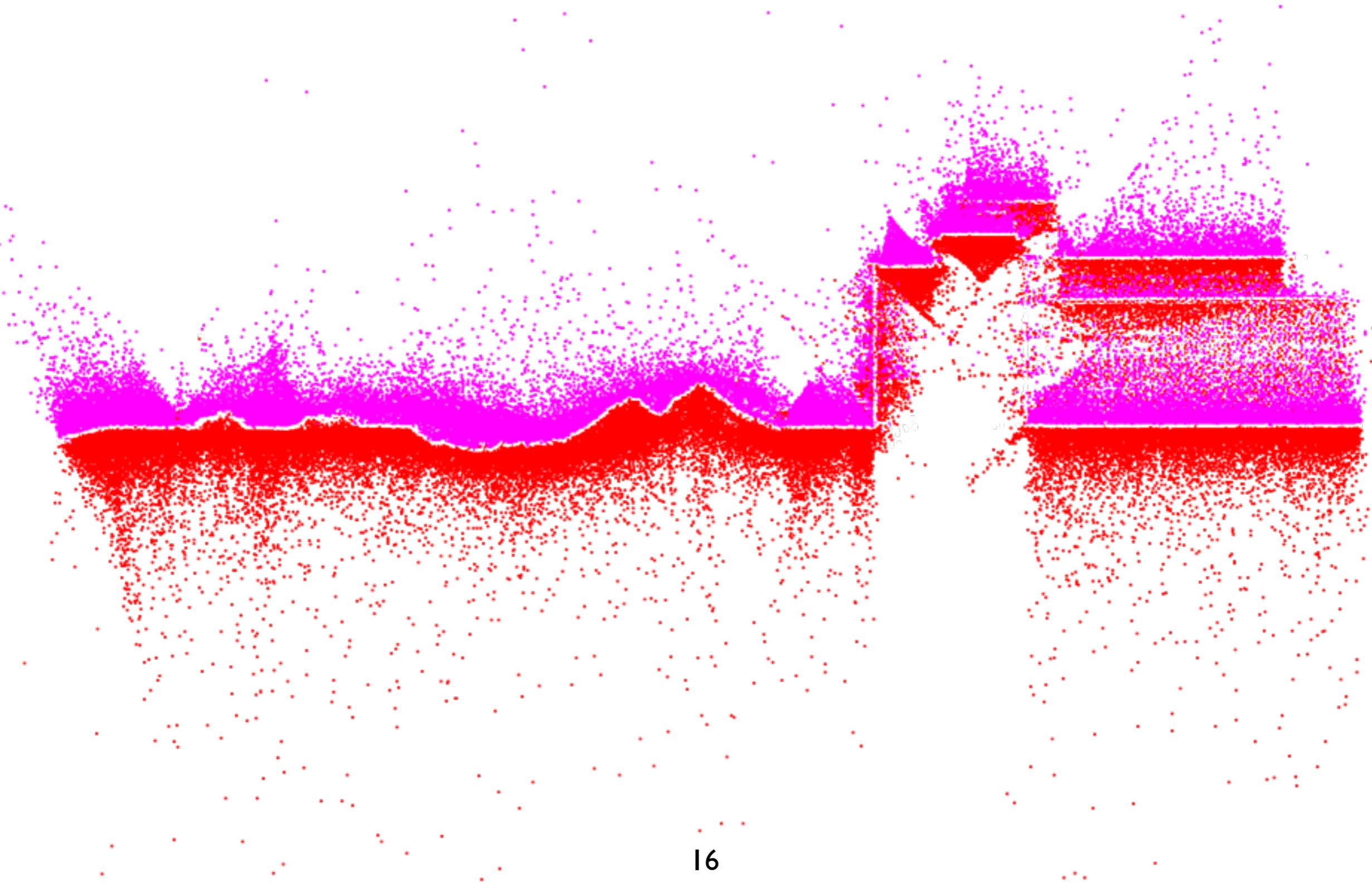
Shrinking balls 3D



Finding important points



What about real data?





Case studies

Case study 1 (Kadaster)

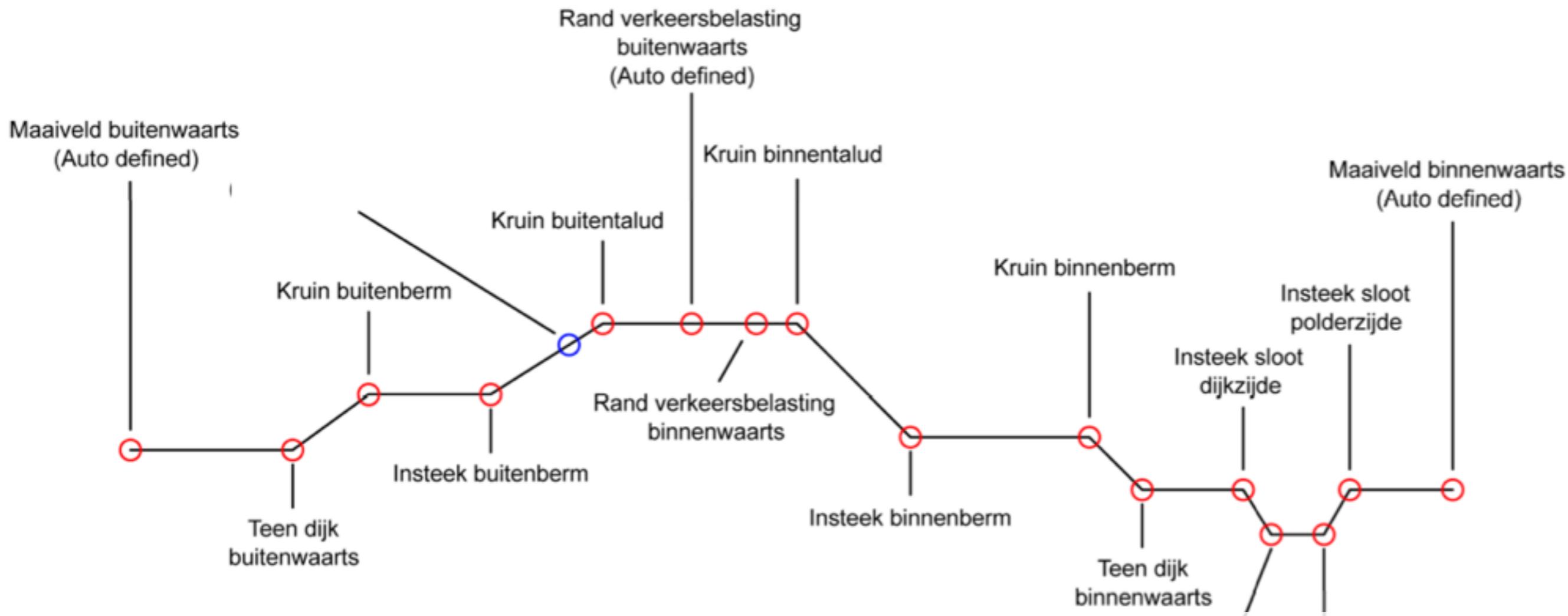
Smart pointcloud thinning for 3DTOP10NL:

Reduce computational cost by reducing number of input points without sacrificing quality of output



Case study 2 (Grontmij, ...)

Finding significant points in dyke profile:
Automate point picking workflow



Other case studies?

- Cleaning messy datasets (Safe Software)
- Simplify roof geometry (Safe Software)
- Separate buildings from terrain (Safe Software)
- ...

3DSM

Introduction & progress

Thank you

References

- Nina Amenta, Sunghee Choi, and Ravi Krishna Kolluri. The power crust. In *Proceedings of the sixth ACM symposium on Solid modeling and applications*, pages 249–266, New York, NY, USA, 2001
- John Chaussard, Michel Couprie, and Hugues Talbot. Robust skeletonization using the discrete λ -medial axis. *Pattern Recognition Letters*, 32(9):1384 – 1394, 2011
- Jaehwan Ma, Sang Won Bae, and Sunghee Choi. 3D medial axis point approximation using nearest neighbors and the normal field. *The Visual Computer*, 28(1):7–19, 2012.

Workflow

