

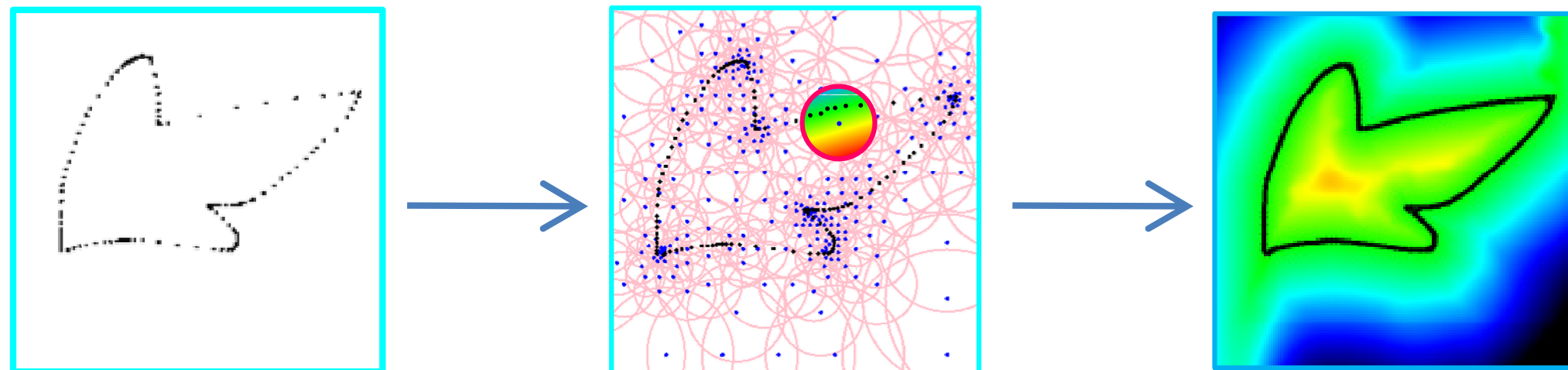
Processing of Scanned Geometry Using Spherically Supported Functions

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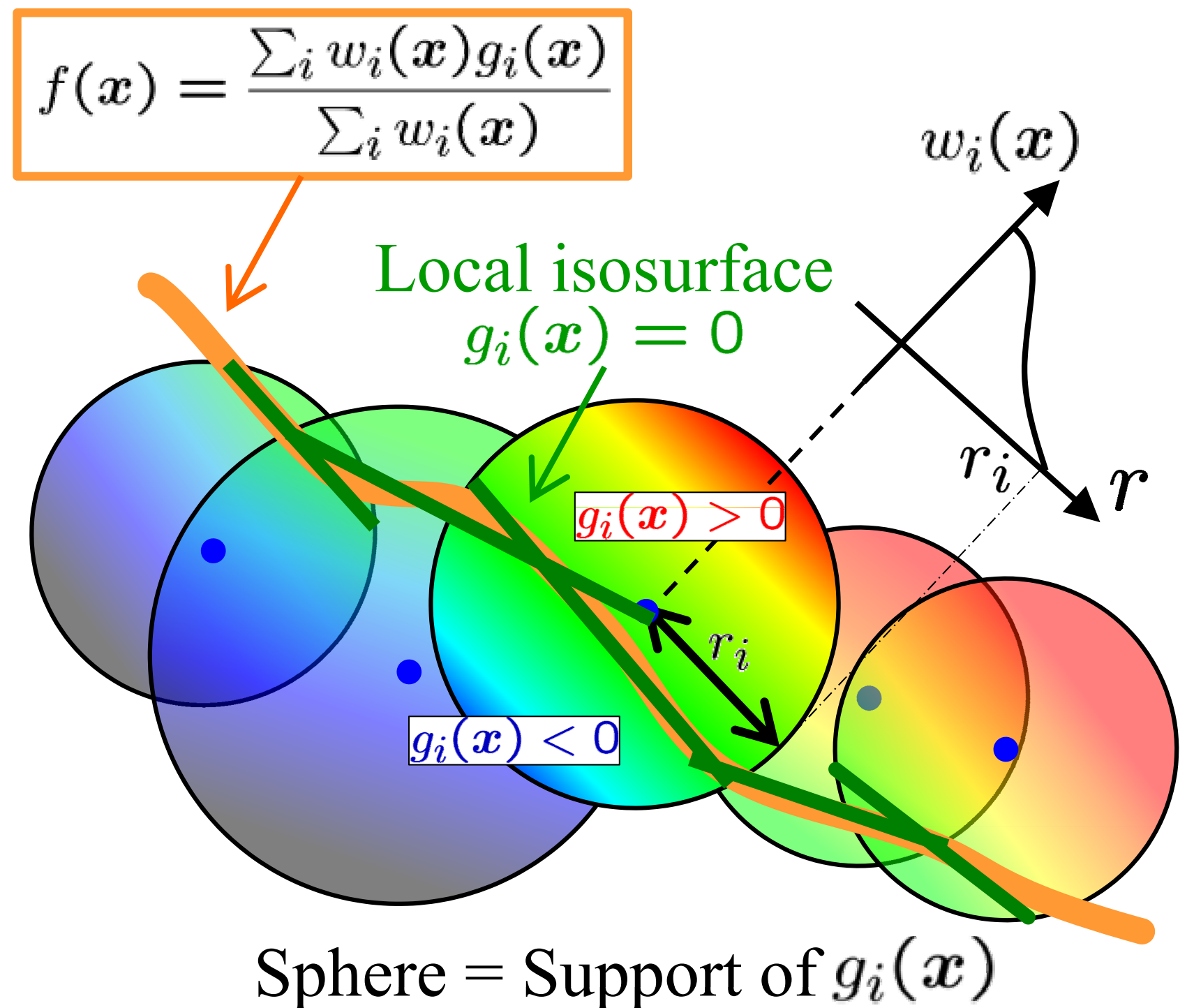
Spherically supported function $f(x)$

is an approximation function which is defined as a weighted average of a set of spherically supported approximations $g_i(x)$.

- surface data \rightarrow signed distance
- volume data \rightarrow intensity



2D surface data Spherical cover Signed distance field



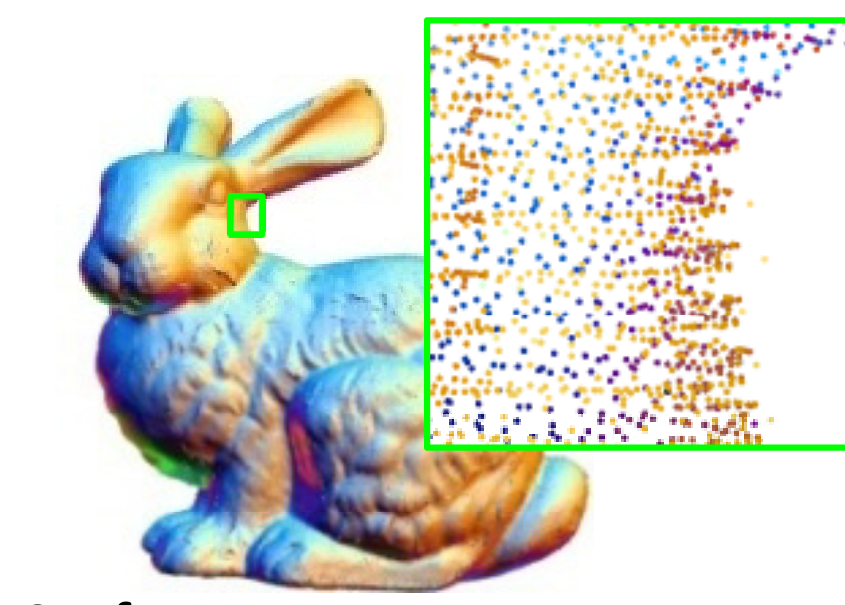
Scanned geometry

usually contains **noise and outliers** which may cause serious problems in applications.



Real object

Scanning



Surface



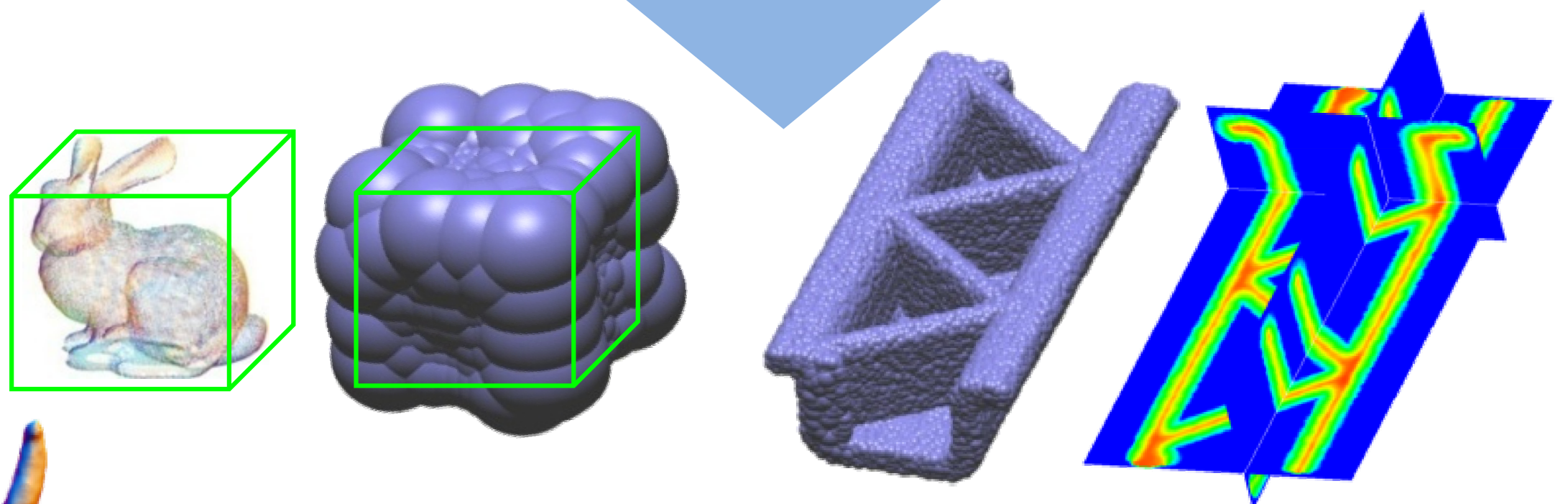
Volume

Scanned geometries

Advantages :

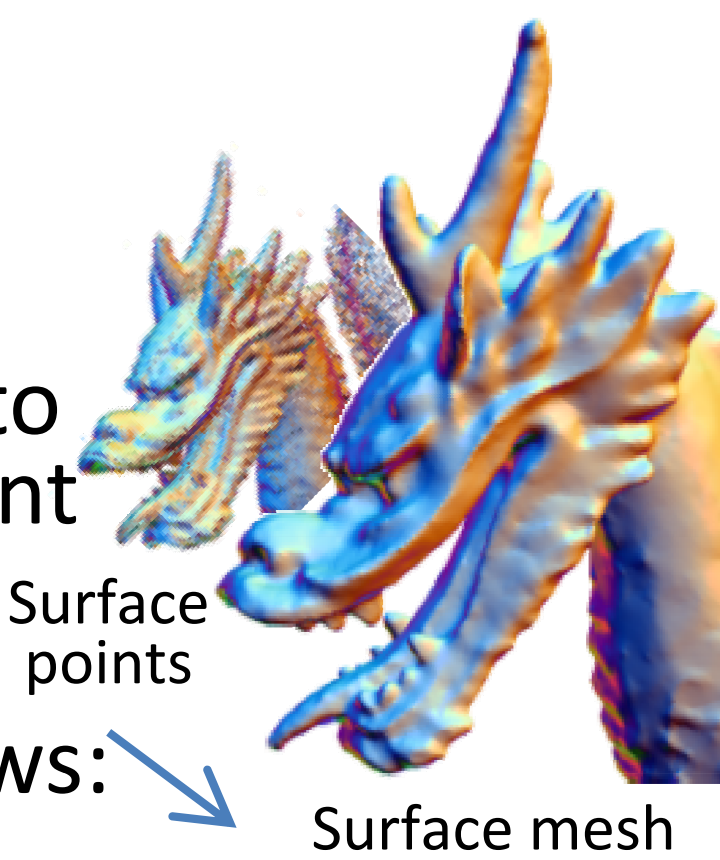
- + Adaptive approximation
- + Noise robust
- + Smooth & precise representation
- + High-order approximation

Generating spherically supported functions

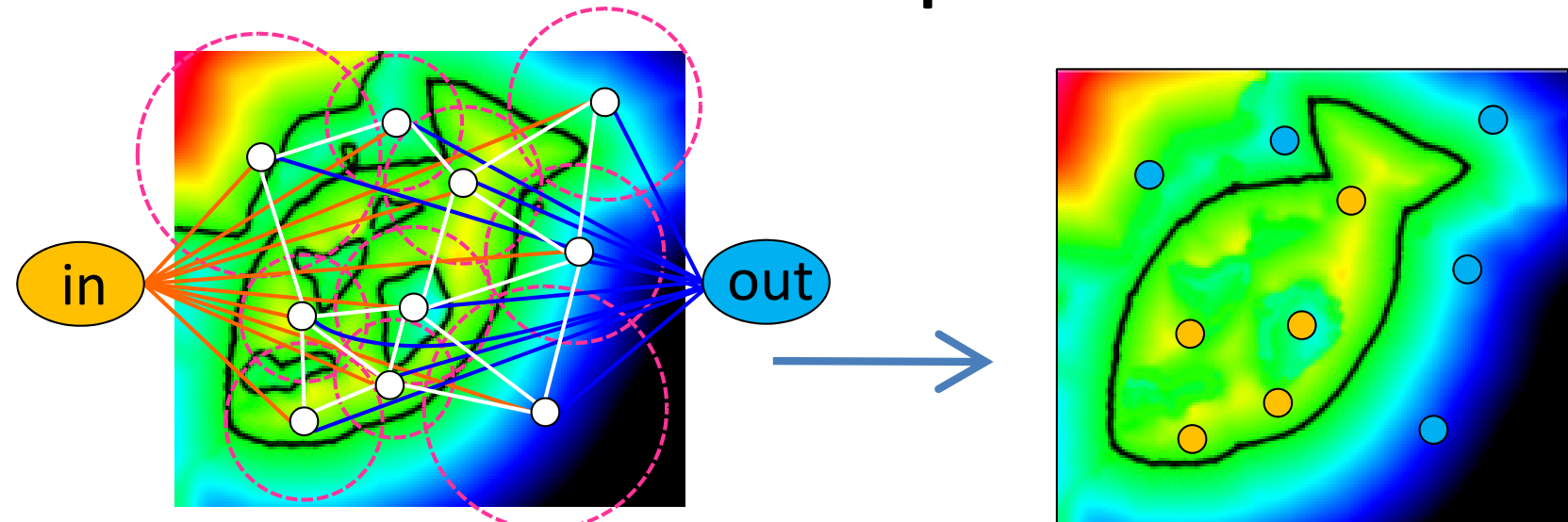


Surface Reconstruction

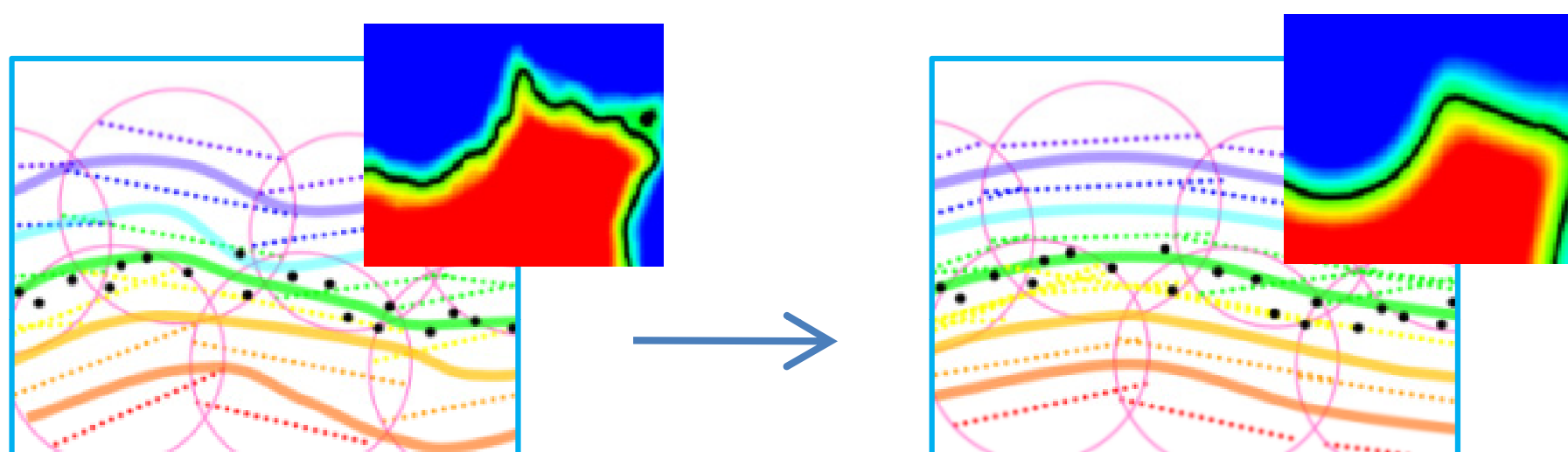
Because of the locality, it is hard to handle data including much amount of noise and outliers only with spherically supported functions. The robustness is realized as follows:



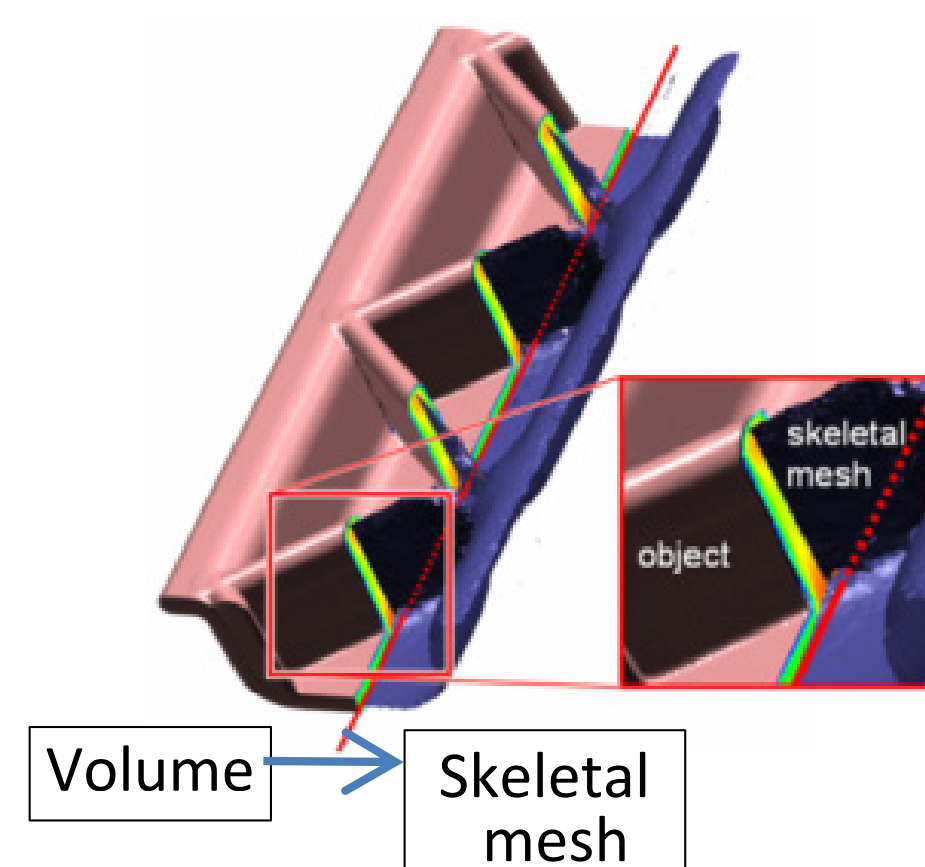
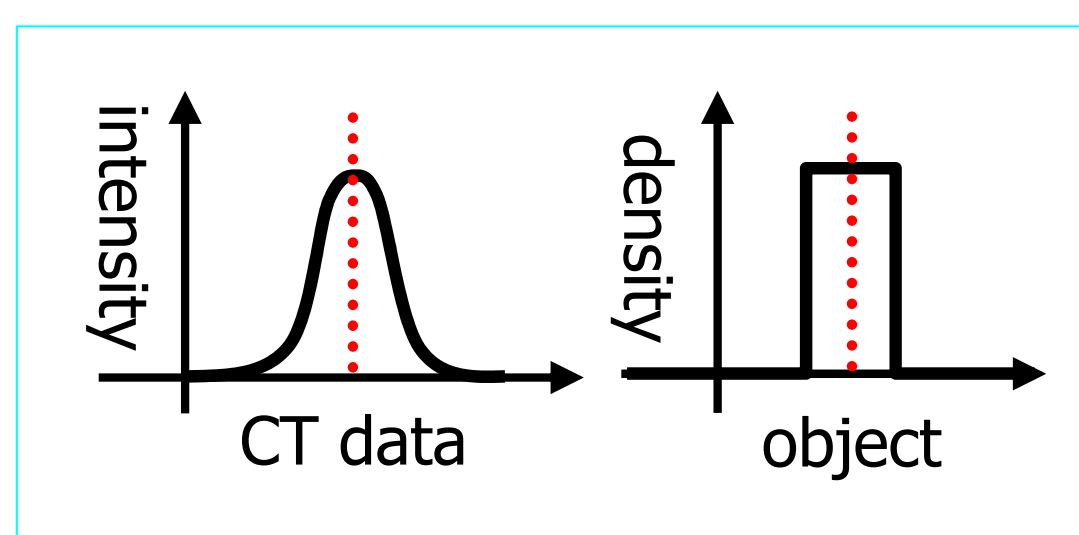
- **Outlier-robust:** Graph-cut



- **Noise robust:** smoothing of local approximations



Skeletal Structure Extraction



- Maxima of intensity \sim Skeletal structure
- **Noise robust** and **adaptive:** using approximated intensity through spherically supported function

