

Topological data analysis for image segmentation

Projektwoche Angewandte Mathematik

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Topological data analysis for image segmentation

- ▶ topology studies the properties of geometric objects that do not change under continuous deformations
- ▶ dimension, connectedness, number of holes...

en.wikipedia.org/wiki/File:Mug_and_Torus_morph.gif
en.wikipedia.org/wiki/File:Spot_the_cow.gif

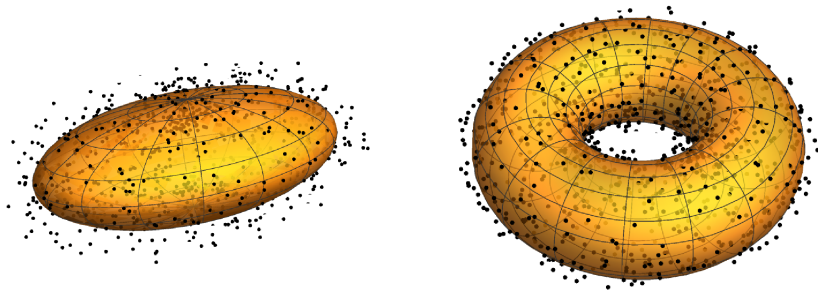
Topological data analysis for image segmentation

- ▶ interpret large sets of data
- ▶ often represented by a noisy point cloud
- ▶ discover the hidden "shape" of the data



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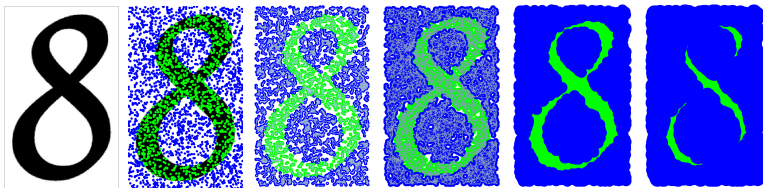
Topological data analysis for **image segmentation**

- ▶ divide a digital image into distinct regions
- ▶ depends on various parameters



Topological data analysis for image segmentation

- ▶ data: a subset of the pixels in the image



Questions:

- ▶ How to choose the parameters to preserve the topological properties?
- ▶ What happens if the image is not only black and white?