Stenomaps: shorthand for shapes

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**What:** Data

**Analogy with Stenography**

**Area-to-line Transformation** for Geometric Abstraction

**Why Abstraction?**
Free up graphical space and distinct visual variables
Direct attention to main data

**Use Cases of Stenomaps**

**Cartographic Lines**
Variation in Pattern and Width
Not as limited as boundary lines

**Spatial Uncertainty**
Selective Perception
Highlight main data by reducing geography
Illusion of Accuracy
Prevent inferences of exact location

**Cross-boundary Data**
Continuous Natural Phenomena
Not tied to political boundaries
Erroneous Perception
Colour interpreted as uniform within each polygon
Stenomaps: less intrusive
Maintain continuity
Give reference to location
Allow comparison between maps

**Design Choices**
$C^1$-continuous
Hand-drawn appearance
Few curves
Low complexity
Area vs Boundary
A trade-off

**4-step Algorithm**
Find feature points
Obtain glyph region
Find backbone
Create glyph

**Glyph Types**
Simple
Locally intersecting
Tree-based

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Parameter Space

Strengths and Weaknesses

- Simple, smooth
- Efficient abstraction
- Represent both area and boundary
- Opportunities to expand the cartographic design space

- Recognizability
- Users must be familiar with the original geography
- Inconsistency in the large parameter space
- No user study

Constraint: Only intended for tasks where exact boundaries are not needed

Scalability

- If a map with borders looks reasonable, its second-level boundaries can likely be transformed with stenomaps.
- Map of a continent: one stenomap for each country.
- Map of a country: one stenomap for each province/state/region.
- Generally, it is equivalent to up to 100 stenomaps per map.
- Algorithm can adapt to produce the desired level of details in stenomaps.

Summary

System Stenomaps

What: Data
Geometry: 2D borders in maps

What: Derived
Area to line transformation, which converts a border to a line that represents both the boundary and the area features.

Why: Task
Present and enjoy the maps with less intrusive borders and without inferences of exact location.

How: Encode
Geotagged data can be encoded into the line as its width or colour, or the data can replace the line by icons or text.

How: Reduce
Dimensionality reduction (area to line).

Scale
100 stenomaps per map (generally equivalent to second-level boundaries).

Questions?
Thank you.