Cartography

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Visualization
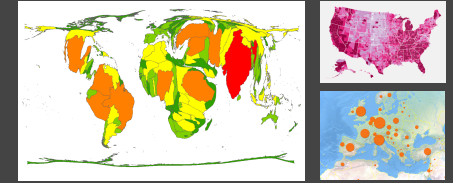
Cartography

visualization of geographically-referenced data

Thematic maps: popular methods

-choropleths
-cartograms
-proportional symbol maps

Thematic maps

Cartogram (left), choropleth (upper right), proportional symbol map (lower right)

## Challenges

-position channel unavailable
-high level of complexity with multivariate or time-series data
-vulnerable to visual clutter and occlusion
-complications with small regions, especially with big values
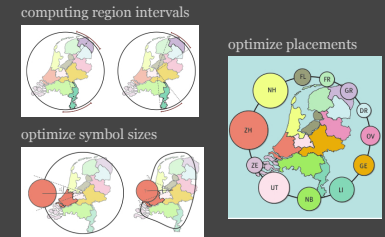-hard to show data at different scales

Three papers

-*Necklace maps*
-*Linked views with parallel coordinates*
-*Geographic weighting for scale-varying*

Necklace Maps
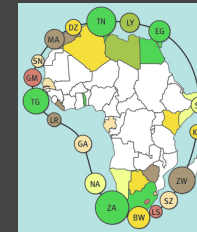
Necklace Maps. Bettina Speckmann, Kevin Verbeek. IEEE TVCG 16(6):881-889 (Proc. InfoVis 2010).

Necklace Maps: algorithm

computing region intervals

optimize placements

optimize symbol sizes

Critique

pros:
-well-motivated and formulated algorithm
-addresses clarity and occlusion
-handles small regions well

cons:
-doesn't really facilitate absolute values
-claims that it overcomes requirement of uniform data within region, not sure it does
-comparison of areas is only relatively better, in absolute terms people don't perceive areas that well

Linked Views: PCP
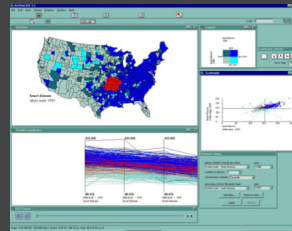
Case Study: Design and Assessment of an Enhanced Geographic Information System for Exploration of Multivariate Health Statistics. Robert M. Edsall, Alan M. MacEachren and Linda Pickle. Proc. InfoVis 2001.

Evaluation

part 1: task-based
-compare performance on simple tasks with scatterplot vs. parallel coordinate views

part 2: exploratory
-ask participants to look for patterns using complete linked-view environment

Evaluation

scatterplot vs parallel coordinates:
-no results, good performance for both

complete environment:
-observed high accuracy overall
-identified some successful interaction patterns

exploratory study:
-choropleth was always used for spatial patterns
-parallel coordinates were always used for temporal trends

Critique

pros:
-interesting solution to well-motivated problem domain
-evidence for the use of linked views with multivariate spatiotemporal data

cons:
-perhaps too many varying objectives
-in some cases, stated goals not exactly the goals addressed
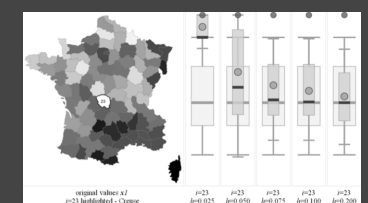-possibly a bit of overstatement of the implications of the accuracy results

Geographically-Weighted Visualization for Scale-Varying Analysis

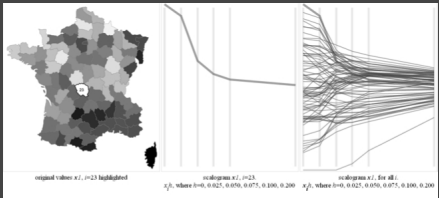## Weighting to show multiple scales
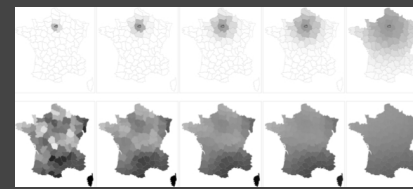
Geographically Weighted Visualization - Interactive Graphics for Scale-Varying Exploratory Analysis. Jason Dykes and Chris Brunsdon, IEEE TVCG 13(6):1161-1168 (Proc. InfoVis 2007).

Boxplots for multiple scales

Scalogram

original values x_i, $i=23$ highlighted

scalogram x_i, $i=23$
x_j/i, where $h=0, 0.025, 0.050, 0.075, 0.100, 0.200$

scalogram x_i, for all i
x_j/i, where $h=0, 0.025, 0.050, 0.075, 0.100, 0.200$

Critique

pros:
- beautiful solutions to the multi-dimensional scale-varying problem

cons:

?

Discussion

Thank you!

References

[1] Necklace Maps. Bettina Speckmann, Kevin Verbeek. IEEE TVCG 16(6):881-889 (Proc. InfoVis 2010).

[2] Case Study: Design and Assessment of an Enhanced Geographic Information System for Exploration of Multivariate Health Statistics. Robert M. Edsall, Alan M. MacEachren and Linda Pickle. Proc. InfoVis 2001.

[3] Geographically Weighted Visualization - Interactive Graphics for Scale-Varying Exploratory Analysis. Jason Dykes and Chris Brunsdon, IEEE TVCG 13(6):1161-1168 (Proc. InfoVis 2007).