A Primer of Geographic Databases Based on Chorems

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Two Visions of France

Official map with administrative levels

A chorem map emphasizing the existing problems

Objective of the paper

- Not results of a research project
- But outlook of a new research plan
- Until now
  - Chorems have been designed manually
- Ultimate goal
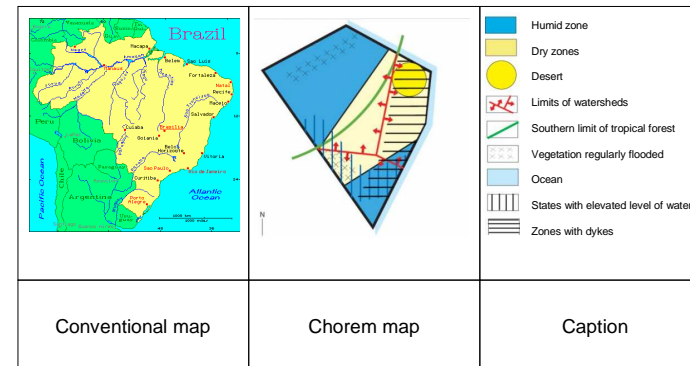 - Automatic generation thru geographic data mining

Contents

- 1 – What are Chorems?

- 2 – Automatic Chorem Discovery and Layout

- 3 – Chorems as a New Way to Access Geographic Databases

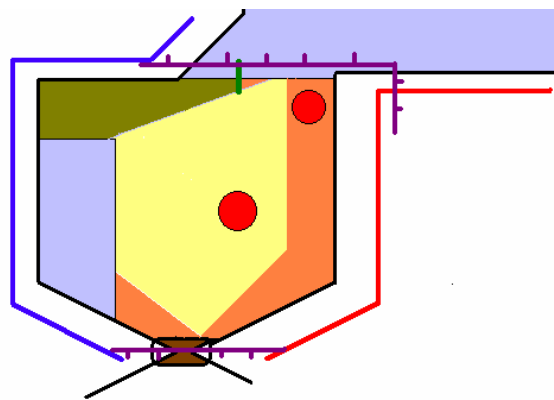- 4 – Landmarks for a Research Plan: Barriers to Be Overcome

1 – What are Chorems?

- Invented by Pr. Roger BRUNET (University of Montpellier)
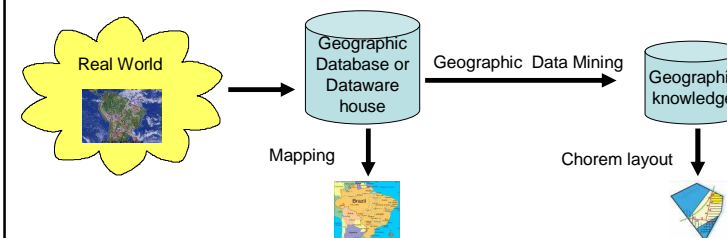
- Schematized representation of a territory

Water problem in Brazil

Conventional map	Chorem map	Caption

Caption legend:
- Humid zone
- Dry zones
- Desert
- Limits of watersheds
- Southern limit of tropical forest
- Vegetation regularly flooded
- Ocean
- States with elevated level of water
- Zones with dykes

Guess!

2 – Automatic Chorem Discovery and Layout

Real World → Geographic Database or Dataware house → Geographic Data Mining → Geographic knowledge

Mapping

Chorem layout

Geographic Data Mining (1/2)

- Lots of techniques have been developed
- Find a combination of techniques suited for geographic pattern discovery
- Differences between
  - Spatial data mining
    - Patterns which are "true" everywhere
    - *If lake + road to the lake* ➔ *restaurant*
  - Geographic data mining
    - Positioned patterns (spatial patterns with toponyms)
    - *Eastern coast of Spain is touristically saturated*

Geographic Data Mining (2/2)

- Starting from a geographic database
- Limited list of geographic patterns
  - Maybe 7 ± 2

- How to define the more important patterns?
  - Suppose you've found 10 000 geographic patterns: how to select 7 ± 2
- Encoding geographic patterns
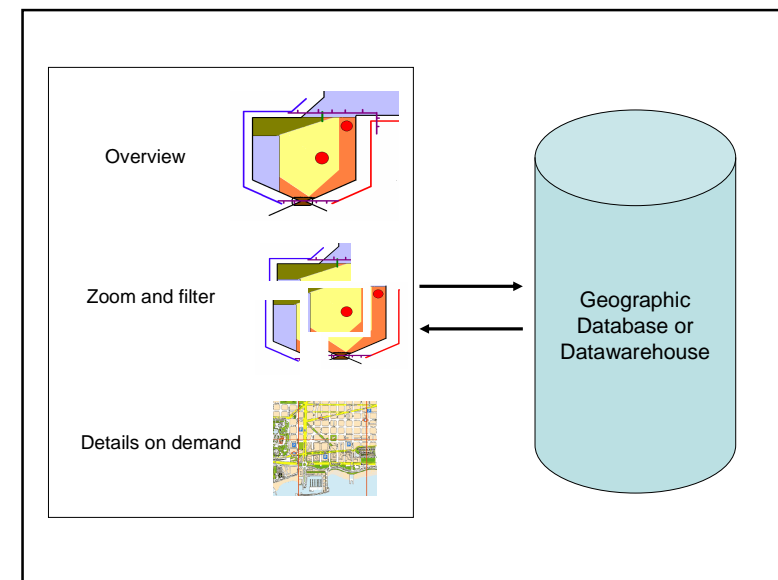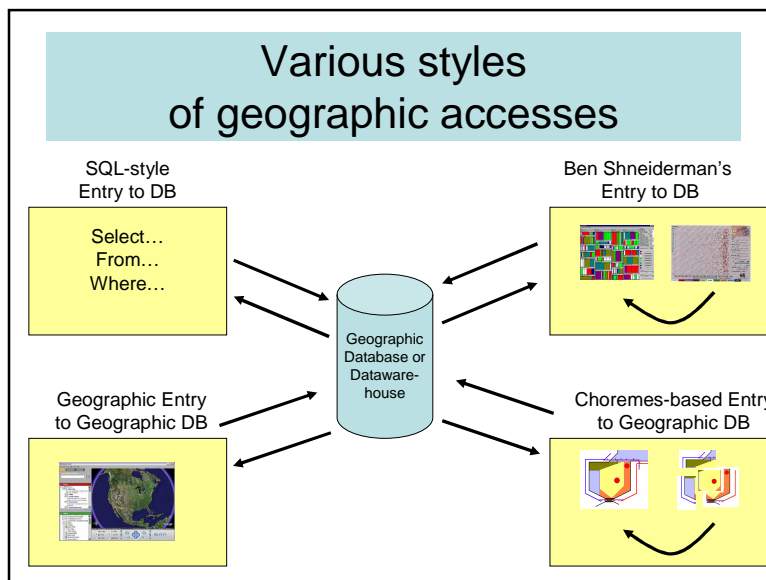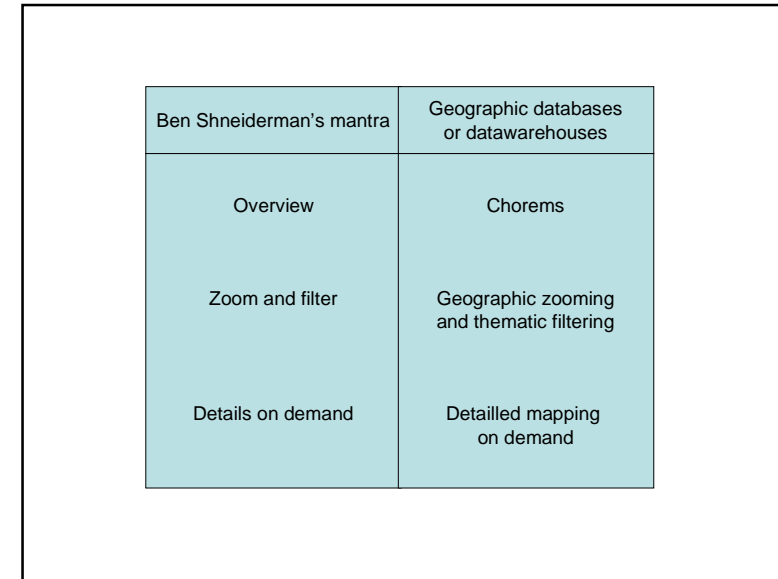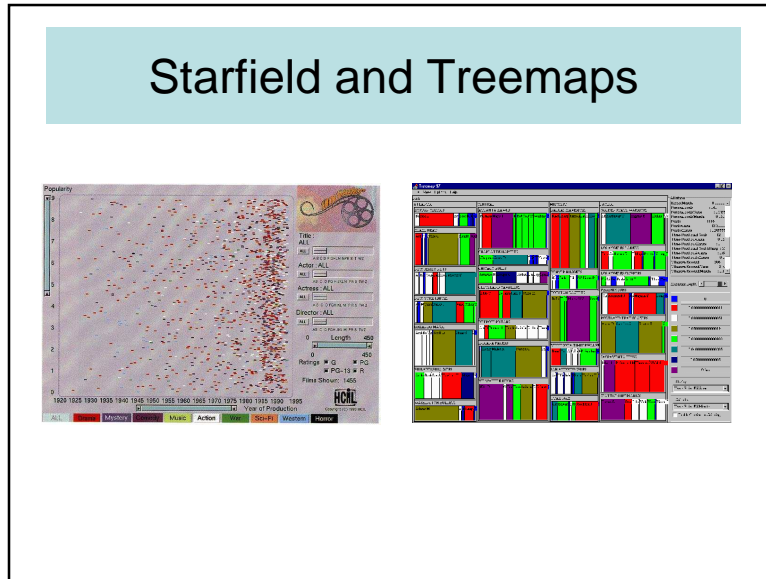 - XML, GML, KML, etc..

Chorem Layout

- Defining a library of elementary patterns (vector format)
- Defining rules for pattern placement
  - similarities with name placement
  - similarities with geographic generalization

3 – Chorems as a New Way to Access Geographic Databases

- Ben Shneiderman's mantra:

« Overview, Zoom and Filter, Details on Demand »

- STARFIELD: to access to objects belonging to the same collection
- SPACE-FILLING TREEMAPS: to access to various collections (bookshelves)

Starfield and Treemaps

Ben Shneiderman's mantra	Geographic databases or datawarehouses
Overview	Chorems
Zoom and filter	Geographic zooming and thematic filtering
Details on demand	Detailled mapping on demand

Various styles of geographic accesses

SQL-style Entry to DB

Select…
From…
Where…

Ben Shneiderman's Entry to DB

Geographic Entry to Geographic DB

Geographic Database or Dataware-house

Choremes-based Entry to Geographic DB

Overview

Zoom and filter

Details on demand

Geographic Database or Datawarehouse

4 – Landmarks for a Research Plan

- 1 – Chorem modeling
- 2 – Geographic Data Mining
- 3 – Discovery of salient features (geographic patterns)
- 4 – Chorem encoding
- 5 – Chorem layout
- 6 – From chorem map to sub-chorem maps
- 7 – From chorem discovery to chorem-based access
- 8 – Interoperability
- 9 – Cognitive aspects

Thanks for your attention!

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