Visual Analytical Reasoning Process – Sense Making Loop

- Gather information and data
- Re-represent
  Choose form that aids analysis
- Develop insight
  Through exploration and visual manipulation
- Produce results (knowledge)
  Hypotheses, Presentation, Tell-a-Story, Communication

Introduce advanced GeoVisual Analytics technique
100% Web-enabled technology for Statistics Analysis and Communication
Spatial-Temporal and Multivariate Data

Universitetet i Lund samarbetar med SCB 1974-1980
Färgbildskrivaren användes för att skapa bilder till FOB 75

eXplorer for regional exploration and analysis
Open eXplorer - a common base
- all eXplorer applications use the same compiled code. The only difference is the configuration and data behind it.
OECD Factbook 256 indicators 1950 - 2007

OECD eXplorer R&D Expenditure vs. High level Education
Collaboration between NCPA and OECD

OECD eXplorer Fertility Rate vs. Employment Women 1972-2006
Collaboration between NCPA and OECD

Data are preloaded or input from client

http://stats.oecd.org/OECDregionalstatistics

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http://stats.oecd.org/OECDregionalstatistics
Colour coding, the mechanisms of pre-attentive processing are triggered. Your brain "gets the picture" in milliseconds and regions "pop-up".

Choropleth Map Component
Dynamic Colour Legend, Perception and Pre-attentive Processing using Colour

Choropleth Map supports Map Layers
Each Layer can be turned off/on

Map Layer Control Panels

Purchase Power for Stockholm 2400 zip code regions
dynamic visualization of large geographical data
Purchase Power for Stockholm 2400 zip code regions
dynamic visualization of large geographical data

Choropleth Map with Pie Charts

Choropleth Map with Focus & Context tool

Focus & Context in the Choropleth Map

Advanced tools for Colour Mapping
Diverging colour scales and dynamic colour scale sliders
Class values based on statistical methods
Percentile or linear class values calculation

Advanced tools for Colour Mapping

Linear vs. Discrete Colour Scale

and divergent at 0.0..

Advanced Scatter Plot – allocate 4 indicators

and Time Animation

1:X-axis
2:Y-axis
3:Colour
4:Dot Size
5:Time

Advanced Scatter Plot – Zoom
Advanced Scatter Plot – Time Animation

Parallel Axes (coordinates)

- Visual inquiries – Threshold and Conditioned filter operations using range sliders, Axis Histogram and Percentiles;
- Pick interesting data items for profile and comparison;
- Re-organize (add, delete, move) attribute axes;

Table Lens

GDP growth vs. GDP per Capita

Dynamically time-linked Map, Scatter Plot and Parallel Axes

DEMO

Spatial Indicators

Time

Stockholm; Education; 2008

Stockholm; [indicators]; [time] 2008 1995

Education; GDP; Population

Large data sets require an architecture facilitating dynamic performance

A growing interest in regional development

From static reports to dynamic visualization Web reports
Aggregated data for the World, NUTS2, NUTS3, NUTS4, NUTS5

Where is the ageing population in the world?

OECD TL2 Regions

TL2

TL3

8 regioner

25 regioner

290 regioner

Aggregated data for municipalities and zip codes, NUTS2, NUTS3, NUTS4, NUTS5

Where is the ageing population in the world?

Östergötland County

Through improvement of human capital in the knowledge based economy and increased access to education

- the regional difference in tertiary education varied from 150% to 70% of the national value...

Local factors matter in attaining growth: more than 40% of GDP and employment growth in recent years are due to 10% of regions

Resources for competitiveness are many (population, age structure, education, activity rates, environmental assets etc.)
Factors for innovation are geographically concentrated; interaction between business and non business innovation activities as well as cooperation among regions are crucial for national innovation objectives:

How does your region do?
Catalonia Spain
Labor Productivity (map), GDP per capita vs. Unemployment Rate

How does your region do over time?
Liguria (Italy), Stockholm, London and Prague 1990-2008
Elderly Dependency Rate vs. Population age 15-65

Regional Development
850 regions (TL2) in OECD countries
elderly dependency (colour), GDP per capita (Y), Unemployment rate (X)

Regional Development
2000 regions (TL3) in OECD countries
Population growth rate (colour) and (Y), GDP Growth rate (X)
Advanced analytics tool – Parallel Axes Chart
New advanced tool for statistics analysis – Filter Operation

Data are pre-loaded

DEMO

Load external data

Load external data

Load external data

Load external data
Treemap and Choropleth Map – 65+
Size of a cell represents the average population 2002-2007
Colour represents population change for four age groups in percent 2002-2007

The treemap-choropleth map combination may lack the strong visual impact that other characteristic cartograms achieve, we argue that it gives a true image of the visualized data and that it is therefore far more suitable for demographical analytical situations.

Challenge and Motivation – for Storytelling
- Interactive Visualization is nice to play with but...
- Difficult to collect and report the results knowledge gained in an Explorative Data Analysis (EDA) session ;
- Develop technologies that enable analysts to communicate what they know through use of appropriate visual metaphor and principles of reasoning and graphics representation;

Visual Analytics Reasoning Process
- Gather information – Tasks?
- Visual representation
  Choose visual forms that aid analysis
- Develop insight
  Through exploration and dynamic visual inquiries
- Produce results (knowledge)
  Presentation, Communication and Story Telling

Capture, Share and Communicate discovery and knowledge
The Story and its Chapters are saved to XML

Collaboration & Sharing through Story Telling
- Explore the data
- Gain insight
- Create a story
- Publish
- Share with colleagues
- Get feedback
Generic eXplorer - Stories

- Architecture for Story -Telling
- Capture the current application state
- Dataset, map positions, scatter plot axes – everything is saved.
- Collaborate with others.
- Video: Story Telling

Generic eXplorer - Stories

- Stories are generated as XML files
- They can easily be shared with colleagues
- Video: Story Telling II

Collaboration & Sharing

- The goal: To gain insight from statistics and spread the knowledge.
- In line with the Web 2.0 development
  - Blogs, Wikis, social networks, OpenSource collaborations
- Solid data (OECD, Eurostat)
- Domain experts
- Analysing tools -> eXplorer
- Publishing tools -> booklets

Capture, Share and Communicate discovery and knowledge

From Story in eXplorer to Dynamic HTML Document

From Story in eXplorer to dynamic HTML document
A server side service for distributing stories through booklets.
Stories created in eXplorer can be stored on the same server through the backend, and then used in other web-based publisher.

eXplorer for regional exploration and analysis

- 100% Web compliant with Adobe Flash and Flex;
- Facilitate explorative and communicative visualization with analytics reasoning aspects;
- Regions are simultaneously explored in dynamically linked views;
- Interactive Time Animation;
- Integrated Story Telling and Web Publishing;

Open eXplorer and the Wizard
Customize your own eXplorer Application

Open eXplorer used in Bolivia