Module INM433 – Visual Analytics

Practical 01

Display Interaction

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Display interaction

• It is often impossible to create a picture that would be fully sufficient for a task

• Interactive operations help analysts to gain more information from a display than would be possible by only viewing

• Purposes of interactive operations:
  • Access exact data values
  • Link pieces of information from complementary displays
  • Decrease display clutter
  • Focus on data portions
  • Find particular pieces of information
  • Compare values
  • ...

Map zooming

Drag the mouse to draw a frame
Map shifting

Drag the mouse to draw a vector
Map: further controls for zooming and shifting

Zooms to the current resolution of the background tiles
Zooming and focusing: other displays

Horizontal and vertical focusers are included in many displays. They are operated by putting the mouse cursor on one of the triangles and dragging the mouse.
Focusing applied to data visualisation on a map

The focusing has made the map more expressive.
Access to exact data values

- **East India and Lansbury**
  - ID=E0500006
  - Mean Age: 30.3
  - religion=Muslim: Population N by religion: 6371

- **Burglary (Offences rates)**
  - 2007/08
  - E05000649 West End: 93
Display linking through highlighting

Clerkenwell
% of people with bad or very bad health: 6.10

5 Burglary (Offences rates)
Display linking through selection

To select: click or drag the mouse.
To deselect: click or drag the mouse again.
To deselect all: double-click on a mark-free location within the display.
Highlighting and selection on a map

- Is applied to the currently active layer (marked in the map legend by a red frame around the layer’s name)
- Selection by mouse dragging works when the button ✓ above the map is in the sunken state:
- The next button deselects all selected objects of the currently active map layer.
Exploration of relationships between attributes using interactive selection
Classification and propagation of classes
Classification and propagation of classes
Filtering by attribute values

Dynamic Query for Population + crime data

Filter out missing values  Clear all filters

Density (number of persons per hectare)
Mean Age
Average distance to work (km)

Query results -> Qualitative attribute

Map of London

Social status:
- AB Higher and intermediate
- C1 Supervisory, clerical
- C2 Skilled manual
- DE Semi-skilled and unskilled

Statistics shown for selected attributes.
Spatial filtering
Modification of colour scale
Visual comparison
Data transformation: before
Data transformation: after

Transformation example: z-score. Each attribute value is transformed to normalized difference from the attribute’s mean.
... + a bit of focusing
Display interaction: a summary

• Main purposes (support of synoptic tasks):
  • Make data representations more expressive
    • Colour scale modification (particularly, diverging colour scale)
    • Outlier removal (by focusing)
    • Data transformations (comparison to mean and median, z-score, logarithmic transformation, …)
  • Combine information from two or more complementary displays
    • Display linking by selection
    • Display linking by classification
    • Filtering (all displays represent the same selected data records)

• Other purposes (support of elementary tasks):
  • Access individual values
  • Find particular values
  • Compare attribute values corresponding to different references
Reading:

http://0-dx.doi.org.wam.city.ac.uk/10.1007/3-540-31190-4

Natalia and Gennady Andrienko

Exploratory Analysis of Spatial and Temporal Data
A Systematic Approach


Section 4.4
Display Manipulation
Questions?

Display interaction