Glyphs

Ivan Zhao
usually, for 3+ dimensional data
information stored in the features,
besides the location
Paper 1: Visualizing Multi-Dimensional Clusters, Trends, and Outliers using Star Coordinates
Kandogan, 2001

emphasis on this paper is not about glyphs, but on multidimensional space

a good paper to start thinking about glyphs
Star Coordinates key idea:
packing N coordinates into a 2D space

\(d_1=10\)
\(d_2=15\)
\(d_3=50\)
\(d_4=33\)
\(...\)
\(d_8=12\)
Star Coordinates key idea:
packing N coordinates into a 2D space

2D space

\[d1=10\]
\[d2=15\]
\[d3=50\]
\[d4=33\]
\[...\]
\[d8=12\]
Star Coordinates key idea:
packing N coordinates into a 2D space

Monday, November 2, 2009
Star Coordinates adjustments
Star Coordinates, *Footprints* glyphs

*footprints* (trace):
how dimensions are correlated
Star Coordinates, *Sticks* glyphs

tradeoff:
finer resolution on coordinates,
higher complexity on glyphs
Star Coordinates, *Sticks* glyphs

each glyph carries its own dimensions

glyph/glyph comparison; not just Glyph/coordinate
Paper 1: *Visualizing Multi-Dimensional Clusters, Trends, and Outliers using Star Coordinates*
Kandogan, 2001

Comments

- a point in the space is not unique
  counter argument: for overview only,
  also, data will take care of themselves

+ simple and minimalist design

good paper. recommend to read
Paper 2: Glyphs for Software Visualization
Chuan, Eick, 2001

domain: Software Engineering
• large number of files
• numerous developers
• multiple releases

why glyphs?
to preserve the “objectiveness”
Glyph #1 InfoBUG

Head
histogram of code types

2 dimensions

Body
file changes

7 dimensions (6 + 1)

Wings
code quantity

3 dimensions

Tail
code line changes

5 dimensions (2 + 2 + 1)

17+ dimensions total!
Glyph #1 InfoBUG

files types

cross glyph comparison

arbitrary glyph location

“objectiveness”
each bugs per release, file, developer

time slider
Glyph #2 Time-wheel

more temporal-centric design
Glyph #2 Time-wheel

Tapering trend

Increasing trend
Glyph #3 3D-wheel

- uniform angle,
- radius carries value
- height encoding time
- sharp apex increasing trend
- balloon shape decreasing trend
Paper 2: *Glyphs for Software Visualization*
Chuan, Eick, 2001

Comments

- infoBUG
  accuracy design and color usage
  maybe too many dimensions

- time-wheel
  which side is up?

- 3D-wheel
  accuracy issue in 3D perception
  occlusion

- didn’t use glyph location
high dimensional glyphs too complex?
maybe not.

first, both papers emphasis on the \textit{qualitative} nature of glyphs

second, \textit{Visual Expertise}
we are capable of high dimensional glyphs

how to design better glyphs?
accelerate learning
finer glyph discrimination
Paper 3: *The Training and Transfer of Real-World Perceptual Expertise*  
Tanaka et al, 2005

20 subjects, 7 days

discriminating Wading Birds and Owls

- half subjects trained on *family* level  
  “owl” v.s. “wading bird”

- half subjects trained on *species* level  
  “Great Gray Owl” v.s. “Blue Crown wading bird”

key: equal exposure, who pick up the “bird glyphs” faster?
“Do they belong to the same family/species?”

- Old images
- New images/old species
- New species
  - other species of owls or wading birds
Result

ANOVA measure for discrimination

better discrimination ability
perceptual exposure is *not* enough
we need detailed perceptual experience

how does this link back to glyphs?

not just look at them, but *think* with them

interactivity is the key?