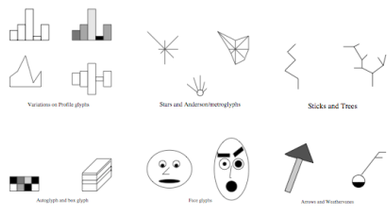
Glyphs

Ivan Zhao



usually, for 3+ dimensional data

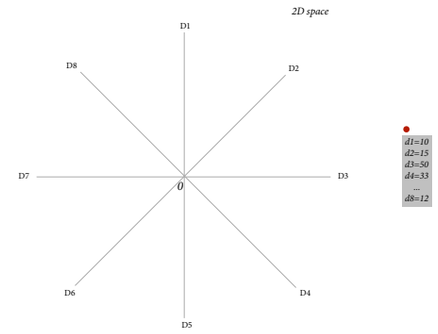
information stored in the *features*,
besides the location

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



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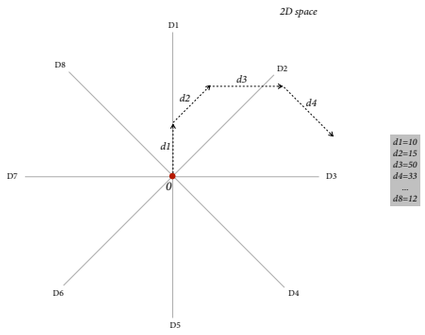

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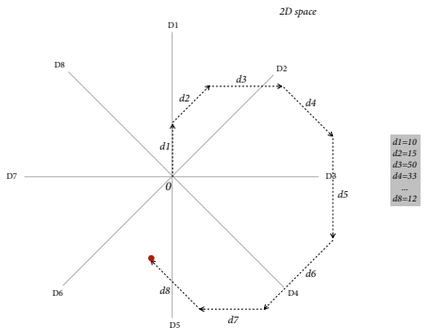
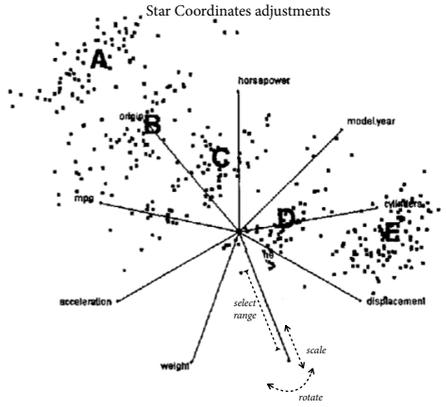
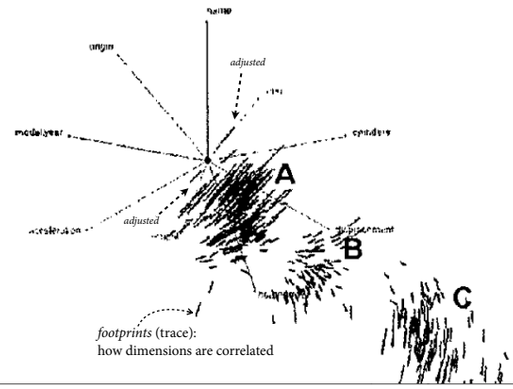


Star Coordinates adjustments

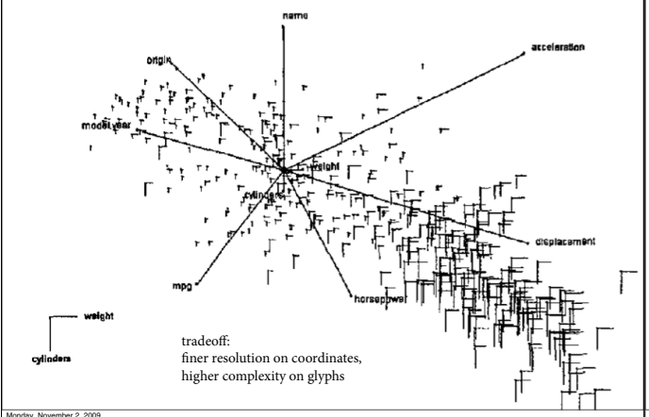


Star Coordinates, *Footprints* glyphs



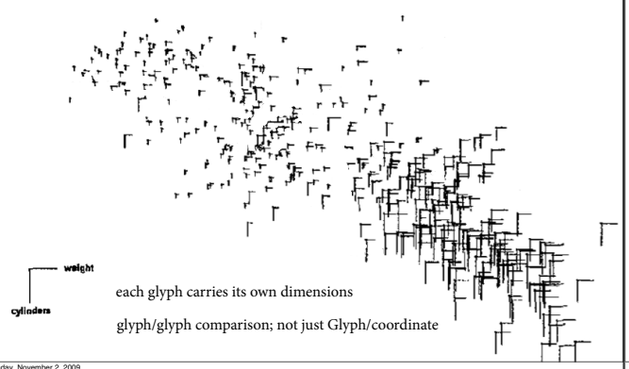
footprints (trace):
how dimensions are correlated

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

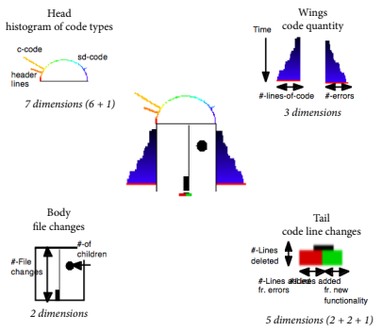
good paper. recommend to read

Paper 2: *Glyphs for Software Visualization*
Chuan, Eick, 2001

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

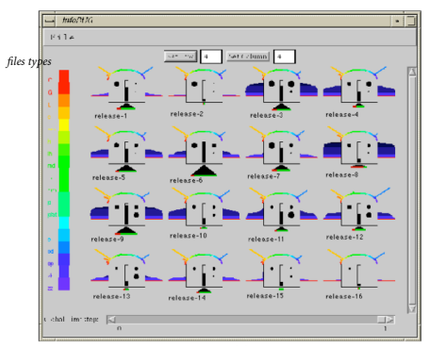
why glyphs?
to preserve the "objectiveness"

Glyph #1 InfoBUG



17+ dimensions total!

Glyph #1 InfoBUG



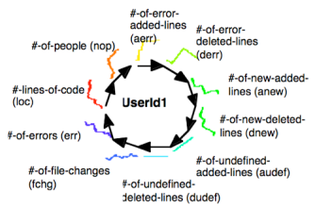
"objectiveness"
each bugs per release, file, developer

cross glyph comparison

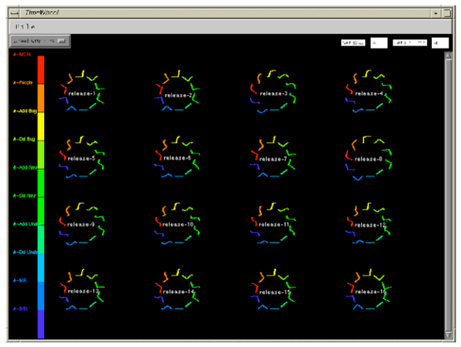
arbitrary glyph location

Glyph #2 Time-wheel

more temporal-centric design



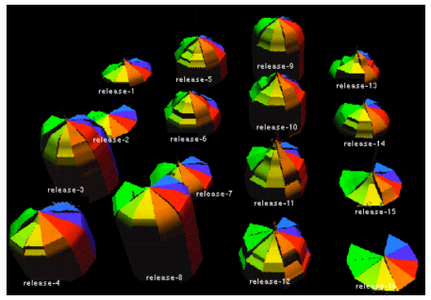
Glyph #2 Time-wheel



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

Start Coord Sticks
- 2 dimension
- in N-dimensional space

infoBug
- 17 dimensions
- arbitrary space

real-world "glyphs"
- hundreds of dimensions

increasing dimension

high dimensional glyphs too complex?
maybe not.

first, both papers emphasis on the *qualitative* nature of glyphs

second, *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?

Test

"Do they belong to the same family/species?"

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

Result

Paper 3: *The Training and Transfer of Real-World Perceptual Expertise*
Tanaka et al, 2005

Comment

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?