Semiology of Visualization

CMSC 436/636
Data Visualization

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Bertin: Semiology of Graphics

- Fundamental graphic variables
  - Location
  - Size
  - Value (brightness)
  - Texture/grain
  - Color
  - Orientation
  - Shape
- Rules for appropriate use
MacEachren on Bertin

- Additional variables
  - Arrangement
  - Texture density
  - Saturation
  - Transparency
  - Crispness
  - Temporal variation
  - Touch: multiple
  - Sound: multiple

Basic Scalar Techniques

- Height Mapping
- Density/Opacity
- Size
- Color
- Texture
Preattentive Processing

- What properties of objects easily perceived by the HVS?
  - Serial search
  - Parallel search -> preattentive

- Tasks
  - Target detection
  - Boundary detection
  - Region tracking
  - Counting and estimation

Preattentive Processing

Boundary Detection


Preattentive Processing

Counting and Estimation

Preattentive Features

Hue

Luminance

Preattentive Features

Orientation


Preattentive Features

Length

Preattentive Features

Closure


Preattentive Features

Intersection

Preattentive Features

Termination


Preattentive Features

Density

Preattentive Features

3D Depth


Preattentive Features

3D Light

Preattentive Features

3D Orientation


Preattentive Features

Direction

Preattentive Features

Flicker


Preattentive Features

Velocity

Preattentive Processing

- Issues
  - Conjunctions
  - Distractions

- Feature Hierarchy
  - Hue > form
  - Luminance > hue
  - Hue > texture
  - Distractions on the hierarchy

- Example
  - [http://www.csc.ncsu.edu/faculty/healey/PP/index.html](http://www.csc.ncsu.edu/faculty/healey/PP/index.html)