Visualization-Aware Color Design

Colors in Isolation:
The Traditional Approach

Colors for Visualization:
A Constraint-Based Framework to Automate Color Design Based on Known Visualization Attributes

Aesthetic Constraints:
Generalize from successful examples
- Smooth shifts between colors
- Color harmony and complementarity
- Appropriate for target mark type
- Avoid harsh colors
- Avoid colors that are too light or dark

Perceptual Constraints:
Derive from perceptual models
- Uniform perceived differences between colors
- Equidistant perceived lightness steps
- Colors discriminable at minimum sizes
- Avoid abrupt color name shifts
- Appropriate for color-blind users

Functional Constraints:
Generate algorithmically
- Related colors for outlier binning
- Unambiguous colors for lowlighting
- Salient colors for highlighting
- Visible colors for labels
- Interpolations for data shapes

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