Color... part 2

Today’s Class

• Mini-Presentations
  • Jesse, Greg, Q
• Readings for Today
• Today’s Crayon Exercise
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Reading for Friday: *choose one*

Choropleth map: statistics per area
must be careful about normalization

- Color selection is not one size fits all
  - don’t always use the same color theme
  - don’t always use the default
- Many options in map making programs
  - No guidance about choosing color schemes
  - Don’t tell them what to do, but allow them to explore options
- Standard (cartographic) conventions
  - Variations in lightness are interpreted as ordering
  - Dark equals more, light equals smaller values
  - No more than 7 colors in a choropleth map
    (Legibility vs. information rich tradeoff)
- Just because you can see differences doesn’t mean you can correlate color back to legend
- Important to consider borders & backgrounds
• Choose a scheme appropriate for:
  – sequential, qualitative, or diverging data
  – Diverging data & color schemes is particularly interesting
  – Are there more than 12 classes?
• Would prefer to start with 1 color, then build a scheme around it (like some website color design apps)
• 3 perceptual dimensions of color are hue, saturation and lightness
• Cartographers seldom use more than seven classes on a choropleth map
• Idea: Combine colorbrewer.org & “choose the right graph” into one tutorial!
• Unfortunate undergrad who had to evaluate all 385 schemes usability
• User study was not scientific, unsolicited feedback only, possibly biased
• Paper motivation could be stronger
• Online tools:
  https://kuler.adobe.com/
  http://www.checkman.io/please/
  http://paletton.com/
  http://colorbrewer2.org/
  http://www.colourlovers.com/

• Why are color space conversions not identical? Isn’t there a standard?
• Simultaneous Contrast Problem** avoid optical illusion
• Program looks like a(n effective) teaching tool
• Nice emphasis on UI (user interface: how the interface is laid out)/UX (user experience: how the product feels)
• Gradients vs. flat colors?
• Limited # of colors means data will be compressed away
• Writing Comments
  – Read like a user guide not a paper
  – light on technical details
  – Was a justification of a user interface more than an academic paper?
  – Title: Color vs Colour? Pick one
  – Paper seemed intuitive, frequently states the obvious
• Paper a bit dated, but website is still maintained and is current
• Flash praised… why did it (was it forced to) go away?
Reading for Friday: *choose one*

- “Color Compatibility From Large Datasets”, O’Donovan, Agarwala, & Hertzmann, SIGGRAPH

- Motivation: graphic design (not directly visualization)
  - Test theories of human color preferences
- Large study of human preference
  - more colors, bigger sets, more users than past studies
  - Diverse
  - Dataset mined from a good choice of color saavy tools
- Color preference can have cultural ties or other personal variations
- Exploratory determination of important features for color compatibility
  - Machine learning
  - training vs. test datasets
- Non experts (MTurk) vs experts (Kuler)
  - Remove inconsistent users
  - Differences between these groups is worth further investigation
- Discovered general yellow-blue preference
  - is that a color blindness compensation?
- User preference, clustering by preference agreement
- Search for nearby theme with highest predicted rating
• Wish they had enumerated findings, e.g.
  – Green and purple are relatively unpopular hues
  – Preferences are not rotationally-invariant around the color wheel
• The “rules” of good color are appreciated even by people not trained in color
  – Examined popular color sets on the color wheel
  – Wish they had more justification to differences between data, bias between different user groups
  – User ratings of color schemes are likely more personal preference, not mostly useability
    • Good color sets get lost in the popularity contest
    • Vibrant sets tend to be most popular, but that’s not everyone’s personal preference
• Unfortunately “large amounts of data” in title, didn’t mean choosing color schemes for large amounts of data (where differentiation of many colors would be important)

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Today’s Crayon Exercise: COLOR!

• Form a team of 3 & brainstorm a dataset with
  – an intuitive 2D spatial layout (e.g., a map of the US, the virtual world of a
    game, floorplan of a shopping mall, regions of the brain, etc.)
  – 3 interesting quantities on that map (e.g., temperature, population density,
    and how likely the population is to vote Republican)
  – Don’t pick the first thing that comes to mind… be creative!
• Each team member gets 2 of these quantities (one primary, one secondary) and makes their own visualization of these quantities in a single image. E.g.:
  – Person A: temperature (vs. population density) on the US map
  – Person B: population density (vs. Republicanism) on the US map
  – Person C: Republicanism (vs. temperature) on the US map
  – Each drawing stands on its own, you are not required to use a common
    visualization scheme
• Drawing from today’s readings... use color very thoughtfully
• Form a hypothesis of the correlations you will find in the data – but you don’t need real or accurate data. Feel free to embellish the data to show off your visualization scheme.

Homework Assignment 5:
Experimenting with Color

• If you haven’t already used at least 2 new (to you!) visualization tools, try something new!
• Prepare multiple visualizations of the same dataset experimenting with different color options, e.g.:
  – Shades of grey
  – Black & White
  – Light vs. dark background
  – Colorblind aware (e.g., red/green)
  – Many colors: cool vs. warm tones, etc.
  – Etc.
• Analyze the effectiveness of each visualization. Compare the visualizations to each other.
• Focus: Visualization Revision (primary), and Design & Presentation (secondary)