Today’s Class

• Today’s Readings
  – “Visualization, Selection, and Analysis of Traffic Flows”, Scheepens et al.
  – “Guidelines for Effective Usage of Text Highlighting Techniques”, Strobelt et al.

• Quiz on Friday

• Readings for Next Week

• Visual Debugging Crayon Exercise / Progress Post #2

• User Study of your Final Project / Progress Post #3

Fig. 10. (a) An overview of traffic flows over the Paris area. Outgoing traffic flows have been marked with the green arrows, while incoming traffic flows have been marked with a red arrow. (b) The traffic flows have been bundled, selected, and the dynamics of these traffic flows are displayed along the movable windows.

- Analyzing trajectories is important & special
  - If you only look at current position, your missing stuff
  - You can extrapolate if you have position & velocity
  - This paper is not about objects with un-predictable, non rule based movement (airplanes not animals or football players)
- Point data manually or automatically clustered into Voronoi cells.
- Discover/search/identify traffic flows
- Summarize/aggregate/annotate dynamics of a flow
- Explore/compare flows to each other
- Produce a visualization
• Tried particles that move with actual or synthetic or constant speeds.
  – Does it allow separation into different flows (higher altitude = closer to camera = faster)

• Our other papers this term: User Study of Novices vs this paper: Expert Feedback (2 controllers w/ 10 years experience at busy French airports!)
  – Validate what they knew to be true
  – Looked for and tried to understand outliers

• Experts thought that tool was useful for:
  – Education/training of new controllers
  – Studying air space “tangle”
  – Complement to existing tools
  – Communication, study statistics, forecast

• Applies to self-driving cars
• Experts are great! But are experts biased to like tools similar to ones they already have?
• Brushing
• Real velocity is distracting... what?
• Use this visualization style to study packet routing protocols?
• Where is the video? I am apparently unable to use Google to find the video.
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“Guidelines for Effective Usage of Text Highlighting Techniques”, Strobelt, Oelke, Kwon, Schreck, Pfister, IEEE InfoVis 2015

Why highlight text?
- Make sure Data Structures students read the instructions
- Make sure the reviewers of my paper/proposal understand my most important contributions
- Challenge: I can’t highlight everything!

How/why/when do you take notes/highlight when reading?
- Technology vs. Strategy?
- How do you use/review your notes/highlighting?

Fig. 1: Text highlighting techniques are commonly used to mark text features in documents. In this excerpt of “Alice in wonderland” all occurrences of adjectives and adverbs derived from part-of-speech tagging are highlighted in bold font, while words with typical adjective/adverb endings are highlighted with yellow background.

Fig. 11: Example of combining techniques letter spacing and italics – according to our analysis this is not an effective combination for highlighting two equally important text features.
• 9 commonly used highlighting techniques
  – How strong is the pop-out effect for each highlighting technique?
  – How much visual interference do the pairs of effects have with each other?
  – Provide guidelines for usage
• Interview NLP researchers (a target user group)
• Test effectiveness of technique
  – in isolation
  – when surrounded by distractors
  – In tasks requiring combination with another technique

• Artificial text without semantics
• Required minimum screen size
• Mouse (not touchpad)
• Avoid learning curves & fatigue effect

• They screened for colorblind users...
  – But did they screen for dyslexia?
• Recommendations
  – What about the overall legibility of the text?
    (increased spacing seems destructive/disruptive!)
Dyslexie is a font that is altered in a way that lets people with dyslexia read better.

OpenDyslexic is a free typeface/font designed to mitigate some of the common reading errors caused by dyslexia. The typeface was created by Abelardo Gonzalez, who released it through an open-source license.[1] Like many dyslexia-intervention typefaces, most notably Dyslexie, OpenDyslexic adds to dyslexia research and is a reading aid, but it is not a cure for dyslexia.[2] The typeface includes regular, bold, italic, bold-italic, and monospaced font styles. In 2012, Gonzalez


• Interviewed experts and their use cases! Great!
• Doesn’t study understanding of text, just visual attention grabbing.
• Maybe surprising relative results conjunctive vs. disjunctive?
• Now curious about different colors
• Prefer techniques that are more than binary (on/off) instead have many values (e.g., color highlighting)
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Fig. 4. The beautiful mess highlights the sonic isolation of the word “you” in this poem. A visualization from a technology probe obscures this isolation (left), whereas rerouting in Poemage reveals the anomaly (right).


Fig. 1. Left: The top twelve overall most memorable visualizations from our experiment (most to least memorable from top left to bottom right). Middle: The top twelve most memorable visualizations from our experiment when visualizations containing human recognizable cartoons or images are removed (most to least memorable from top left to bottom right). Right: The twelve least memorable visualizations from our experiment (most to least memorable from top left to bottom right).
“Bubble Sets: Revealing Set Relations with Isocontours over Existing Visualizations”, Collins, Penn, & Carpendale, IEEE TVCG 2009

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• **Homework for Thursday April 14th:**
  Progress Post #1: <depends on project>

• **Homework for Thursday April 22nd:**
  Progress Post #2: Using Visualization for Debugging
  – Bloopers
  – Designing & interpreting intermediate visualizations

• **Tuesday April 26th:** In-class work session
  – Have a specific item you want viewer/user feedback about
    (teams have 2 distinct items)
  – Targeted demo of your project one-on-one to 5 classmates
    (teams split up)
  – Give & receive specific (& possibly overall) feedback

• **Homework for Thursday April 28th:**
  Progress Post #3: Design of a formal user study
  – Summarize the results of your “pilot study” on Tuesday
  – If you had unlimited time/money….
    How could you validate the effectiveness of your final project?

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**Crayon Exercise: Visual Debugging!**

• Teams of two. Someone you haven’t worked with before…
  You may not team up with your final project partner!

• Each person should explain a software debugging/validation challenge
  (either current or anticipated) from their final project.
  – Note: You should probably focus on “unit test” debugging of a subtask
    of the project not an whole picture “end-to-end” debugging.

• Explain the details of a sample input, intermediate computation
  information that could be gathered, and expected output for that subtask.

• The other person should propose and sketch a visualization that might be
  helpful to diagnose and solve the problem.
  – Use color, spatial layout, labels, animation, connections, thoughtfully, to
    cram as much information as might be helpful in debugging.
  – It doesn’t need to be beautiful, but the user should be able to find
    patterns or outliers.