Review and Final Thoughts

CS4460 - Information Visualization
Spring 2019
Alex Endert

the final

Topics

- The final exam covers the entire semester
  - more heavily weighted towards the second part of the semester (after mid-term)
- Covers HWs and Ps
- Main source of materials will come from lectures, in-class discussions, and in-class exercises

d3

- There will be ~2 d3/programming questions
  - You will not have to write code.
  - You may have to say what a part of code does, what visualization it produces, what it changes in the visualization, ..
- Your Ps are good places to start
  - These cover concepts, and questions on the final can cover concepts that stem from these but ask them in different ways

Drawing visualizations

- You may be asked to sketch a visualization from data
  - OR, generate a data table from a visualization
- Alternatively, you may be asked to sketch how you would improve an existing visualization, and state why the one you drew is better.
  - E.g., what did it do wrong, and how did you fix it?
  - Remember, you have **scientific knowledge about what is wrong and how to improve it**, so you should not answer "this vis is ugly, I would make it look better". Use the principles we have covered throughout the whole semester to ground your answers.
  - e.g., did it use an ineffective data mark? is the data-ink ratio low? is the chart type ineffective/wrong? …

Main topics

- Before Midterm
  - Multivariate data and charts
  - Perception, Gestalt, Tufte, Few
  - Tasks, Sensemaking
  - Geospatial, Storytelling, Timeseries
- After Midterm
  - User interaction
  - Text Visualization
  - Graphs, Networks, Hierarchies
  - Visual Analytics

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- What are some examples of that?

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- What are some examples of that?
  - Explaining which tasks a text vis supports well
  - Explaining how visual analytic systems support sensemaking
  - What visual encodings are used in a word cloud?

User Interaction

- What is the definition?
- Taxonomies of interaction (there was 1 we talked about more than others)
  - Each of these have categories/types
  - Each type has examples
- Dynamic Query
  - What is it? Pros? Cons? Examples?
- Controls in the vis, vis in the controls

Text

- What makes text (as data) special/different?
  - terminology, challenges, process to go from raw data to data table, …
- Know key text visualization techniques
  - Pros, Cons, (at a high level) how to create them
- From words, to phrases, to documents, to books/large collections
  - you should be able to describe how the techniques we cover work

Time Series

- Define the topic
  - Continuous, Discrete, Periodic, …
- Aggregating events
  - Lots of examples: EventFlow, …
- Searching over time series visualizations
  - E.g., how do you do dynamic queries over a time series data visualization?

Visual Analytics

- What's the main difference between VA and InfoVis?
- Lots of approaches that use analytic models
  - dimension reduction, clustering, …
  - details (math) of these is not as important, but the high-level understanding of what they do is (how do you go from raw data to vis?) What does the vis show e.g., GalaxyView?
- Importance of user interaction
  - E.g., what does "incorporating user feedback" mean?
- What are some disadvantages to VA approaches
  - Think back to us exploring InterAxis, use case from the Stanford Dissertation Browser

Where to focus

- Focus your time studying on concepts after the midterm.
- However, the concepts from after the midterm require an understanding of basic concepts we talked about before the midterm

- E.g., to understand how a Wordle works, we need to understand basic visual marks, how effective they are, … We need to understand perception, and how preattentive processing works, …

Tips

- Get some (enough?) sleep the night before
- Plan time on each question carefully
  - i.e., don't spend all your time on 3 questions to get them perfect, while ignoring the others
- Answer all the questions!
  - partial credit is available for non-MC questions
- Trust your knowledge
  - you know more than you think
  - if you've attended and participated in discussion, **there should be no surprises**
- Practice/rehearse likely questions
  - you should have a pretty good idea of what questions (or general areas of questions) should be on the final
  - **practice** them!

Let's try one now

- Get into small groups
- Come up with 1 (good) question and answer to put on the final
- Write it down on a piece of paper
- You don't have to write your name on them
- Then, I'll call on a few of you to share your questions
- Finally, I'll collect the questions, scan them in, and post them to Canvas

- *1 of these questions will be on the final*

Closing InfoVis **Reflections** and **Thoughts**

Data is becoming Ubiquitous

- The need to analyze data is growing beyond technical fields and jobs
  - not only intelligence, business, research domains
- our **lives** are becoming more data-driven.
  - hard to find tasks today that don't involve some form of data

Visualization is one tool, others exist

- we should consider the broader spectrum of systems, techniques, tools available
  - design for this heterogeneity
  - find ways to couple, where possible
  - vis is one of many tools to use when it comes to making sense of data; respect that others exist as well, and that vis fits into this ecosystem
- "**visual analytics**" - coupling human & computation & visualization
  - exciting area
  - lots of potential impact to society
  - lots of work left to do :)

Empower People!

- go advance the ability for people to make decisions using data
  - requires more than just academia! .com, .gov, .?
- Be an advocate for data literacy
- Get angry!
  - y'all know a lot, use it!
  - when you see projects/ideas/concept that you disagree with - speak up!
- Knowledge and insights are high-value commodities
  - as you advance in your careers, remember this; **you're changing the World**! Change it for the better

Keep in touch!

- I have the honor of teaching and working with the **smartest and brightest students in the world**
- drop me a line from time to time to let me know what you're up to!
- ok, Alex will get off his soapbox now…

Big Thanks to Matt, Emily, Fred, Julia, Rachel!

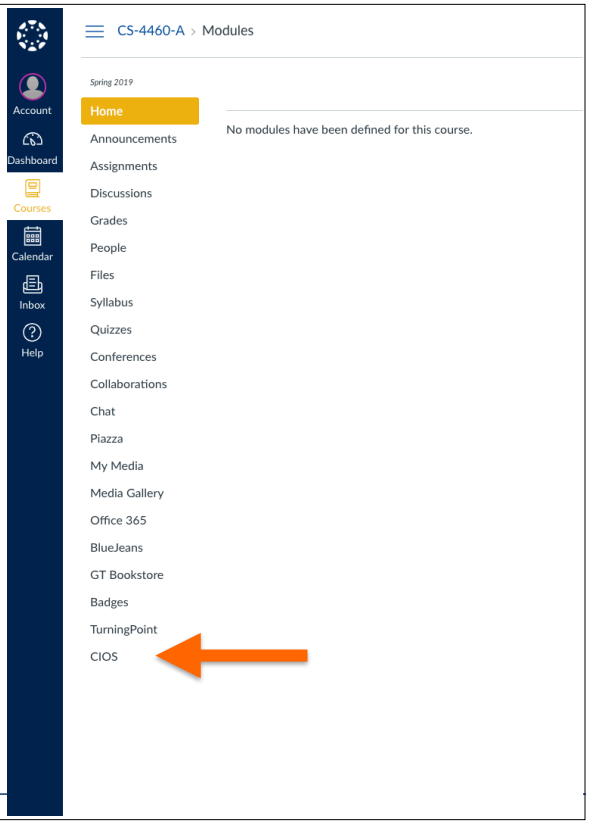
All the grading, email, TA support, …

Without their help, this course would not have been possible!

Also, thanks to (all?) y'all!

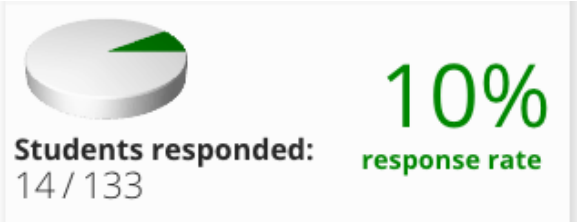
CIOS

- Course Evaluations are due
  - I'll continue to send reminders through Canvas announcements
  - please take a moment to fill out the online form
  - instructors and GT **take these seriously**
- The sooner that everyone does these,
  - the less emails I get from the chair of the school
  - the less email you all get from me
  - the more time we can all spend on things other than email
  - everyone wins :)



CIOS

- If we can get the response rate to 70% by 4/26 @ noon, I'll post 1 question that's on the final to Canvas.
  - this is in addition to the 1 question from the set you all generated today, **so you'll already know 2 whole questions before taking the final**



as of 4/18 @ 10am

also, 3d pie chart??!?!?

FINAL: 4/30, 2:40 - 5:30pm

- exam in this classroom
- you will only need pencil, eraser, maybe a ruler (not required)
- no other material allowed

- you'll notice there's no class on Tuesday
  - use that time to form study groups, or otherwise go over the questions uploaded from today as a group
  - several studies have shown how group studying helps people share and understand information