Information Visualization

Intro, Time Series Exercise

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http://www.cs.ubc.ca/~tmm/courses/547-19

Visualization (vis) defined & motivated

Computer-based visualization systems provide visual representations of datasets designed to help people carry out tasks more effectively.

Visualization is suitable when there is a need to augment human capabilities rather than replace people with computational decision-making methods.

• human in the loop needs the details
  – doesn’t know exactly what questions to ask in advance
  – long-term exploratory analysis
• speed up through human-in-the-loop visual data analysis
  – presentation of known results
  – stepping stone towards automation: refining, troubleshooting
• intended task, measurable definitions of effectiveness

Class participation
• in-class group/individual exercises
• workshopping/critique for projects
• crucial part of course, attendance expected

Finding me
• email is the best way to reach me: tmm@cs.ubc.ca
• office hours Tue right after class (5-6pm)
  – by appointment
  – unlikely to catch me dropping by usually either in meeting or elsewhere
• X661 (X-Wing of ICICS/CS bldg)
• course page is font of all information
  – don’t forget to refresh, frequent updates
  – http://www.cs.ubc.ca/~tmm/courses/547-19

Audience
• no formal prerequisites
  – many areas helpful but not required
  – human-computer interaction (HCI), CS 544 the same or equivalent
• computer graphics, computer science, machine learning, statistics, algorithms, “application domain”
• programming skills required for most project types
• to non-CS people
  – if no programming background, see do analysis or survey project
• communication skills important in English for success
• substantial reading, writing, discussion, presentations
• need strength in at least one of these 3: programming, English, HCI
• unsuccessful combination: weak ESL, weak programming, no HCI background
• open to informal auditors
  – some or all days of readings/discussion/exercises, you’ll get out of it what you put into it...

Marking
• 10% Participation
  – 25% Projects
  – 15% Intermediate Milestones (pass/fail)
  – extensive feedback along the way
  – self-assessment in milestone not mandatory
  – goal: help you make projects the best they can be!
• 15% Final Presentation
• 20% Final Report
• 50% Content
• 25% Presentations (gently depending on final enrollment)
• 75% Class: Summary 50% Analysis 25%, Critique 25% 25% Delivery Presentation Style 50%, Slide Quality 30% 25% Participation
• 60% Written Comments
• 25% In-Class Work/Surveillance (pass/fail)
• 15% Discussion

Projects [50%]
• groups of 2, 3, or 4
• workload/critique for projects
• crucial part of course, attendance expected
  – tell me in advance if you’ll miss class (and why)
  – tell me when you recover if you were ill
  – (written comments credit still possible if submitted in advance)

• BYOD (Bring Your Own Data)
  – you (or your teammates) have your own data to analyze
  – thesis/research topic
  – personal interest
• flexible with another course (sometimes works, but timing may be tricky)
• FDOI (Find Data Of Interest)
  – many existing datasets, see resource page to get started
  – http://www.cs.ubc.ca/~tmm/data/measurements.dat
• can be tricky to determine reasonable task

Class sessions
• first part: read & participate [30%]
  – before class:
    – you do readings (~4 mix of chapters & papers)
    – you submit comments before class
    – you respond to at least two comments from classmates
during class:
  – sometimes I lecture (briefly) and we discuss
  – frequent in-class work/interaction/critique
  – highly likely presentations [25%]
  – before one of the classes you read paper I assign on topic of your choice
  – during this class you present it to everybody else (~10-15 min)
  – TBD depending on final enrollment

• second part: participate [70%]
  – in-class group/individual exercises
  – workshopping/critique for projects

http://www.cs.ubc.ca/group/infovis/resources.shtml

• textbook
  – Tamara Munzner: Visualization and Analysis and Design: AK Peters Visualization Series
  – hardcover bundled with ebook
  – library has multiple free ebook copies
  – no-you-havestorecheapestisinamazon.com
  – hardcover bundled with ebook
• papers
  – links posted on course page
  – all links, use library Ezwify or off campus
  – readings posted by 6 days before class
• 4 each session: mix of chapters & papers

Comments submission & marking
• written comments on reading in advance, in two rounds
  – round 1 due 10am (4 hrs before class), 90% of comment mark
    – for each reading
      – bring printout or laptop with you, springboard for discussion
      – post to Canvas discussion group
    – round 2 due 1:30pm (30 min before class), 10% of comment mark
    – written responses to at least 2 comments from classmates
    – you can only read comments from others after you post your own
    – start as pass/fail marking, see how it goes
      – switch to explicit marking if quality concerns

Readings
• in-class group/individual exercises
• workshopping/critique for projects
• crucial part of course, attendance expected
  – tell me in advance if you’ll miss class (and why)
  – tell me when you recover if you were ill
  – (written comments credit still possible if submitted in advance)

• in-class group/individual exercises
• workshopping/critique for projects
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Now: In-class design exercise, in small groups

- Five time-series scenarios
  - A: every 5 min, duration 1 year, 1 thing: building occupancy rates
  - B: every 5 min, 1 year, 2 things: currency values (exchange rate)
  - C: several years and several things: every 5 min, 5 years, 10 currencies
  - D: many things: every 5 min, 1 year, CPU load across 1000 machines
  - E: several parameters, many things: every 5 min, 1 year, 10 params on 1000 machines

- Small-group exercise: 15-20 min
- Reportback: 30-40 min
- Design space examples/discussion: 20-30 min

Presentations [20%]

- probably - depends on final enrollment! TBD
- present, analyze, and critique one paper
  - send me topic choices, I will assign papers accordingly
  - analysis according to book framework
  - critique of strengths and weaknesses
  - timing
  - exact times TBD depending on enrollment
  - likely around 3-5 minutes each

Enrollment

- don’t worry if you’re not registered yet, just attend and keep up
  - major churn is normal the first few weeks
  - spaces will definitely open up
- do make sure you’ve signed up on paper sheet going around!
- registered students currently have fab access to FSC 2330 door
  - will update after final enrollment settles (after Sep 17)
- you can work in this room when not otherwise in use
  - other classes: Tue/Thu 9:30-11am, Tue 5-8pm, Fri 1-4pm
  - DFP Seminar: 2nd & 4th Wed 12-1pm

Case A: 3D Approach (Not Recommended)
- extruded curves: detailed comparisons impossible

Case A: Cluster-Calendar Solution
- derived data: cluster hierarchy
- juxtapose multiple views: calendar, superimposed 2D curves
- some additional slides required

Case B: Stack Zooming

Case C: ChronoLenses

Case D: RankExplorer

Case E: LiveRAC video

Next Time
- to read
  - VAD book, Ch. 1: What’s Vis, and Why Do It!
  - VAD book, Ch. 2: What: Data Abstraction
  - VAD book, Ch. 3: Why: Task Abstraction
  - paper: Design Study Methodology

Break