Wrapup: Research Papers and Process

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Final papers

• PDF use InfoVis templates http://www.cs.ubc.ca/~tmm/courses/547-19
• no length cap (illustrate freely with screenshots!)
– design study / technique: aim for at least 4-8 pages
– analysis / survey: aim at least 15-20 pages
• ok to re-use text from proposal, interim writeup
– encourage looking at writing your correctness and style guidelines
• strongly encourage looking at previous examples
– www.cs.ubc.ca/~tmm/writing.html#examples
– Example Past Projects
– browse 2015, 2014, … reports

Course requirements vs research paper standards

• research novelty not required
• missed discussion of implementation is required
– part of my judgement is how much work you did
– high level: what toolskits etc did you use
– medium level: what pre-existing features did you adapt
– low level: what new implementation did you write?
• design justification is required
– (unless analysis/survey project)
– different in flavour between design study projects and technique projects
– technique explanation alone is not enough
• publication-level validation not required
– user studies, extensive computational benchmarks, utility to target audience

Report structure: General

• low level necessary but not sufficient
– flagged grammar/punctuation
– sentence flow
• medium level: order of explanations
– build up ideas
– high through low level: why/what before how
• paper level
– motivation: why should I care
– overview: what did you do
– details: how did you do it
• section level
– overview than details
• sometimes subsection or paragraph level

Report marking

• required: at least material I’ve listed
– you may include more material, you may choose alternate orderings
• reminder: project content is 60% of entire project mark
– report is 25%, presentation is 15%
Contributions in research papers

• what are your research contributions?
  – what can we do that wasn't possible ... reading of previous work
  – goal is clarity, not overselling (limitations typically later, in discussion section)  29

Process & Pitfalls for InfoVis Papers

• length (19 projects)
  – 14 min for 3-person teams, 10 min for 2-person teams, 10 min for 1-person teams
  – includes questions for 3 min (brief questions only)

• session structure
  – order alphabetically first name, as on project page (with or without)
    – 2 breaks, between each set of 4 presentations
  – demo invited, friends welcome, refreshments served

• presentation structure
  – slides required (mention slide numbers)
  – slides or slides unrelated
  – play, or demo demonstration/video for backup strongly encouraged
  – often not obvious
  – should be standalone
  – don’t assume audience has read proposal or updates
  – should be standalone
  – don’t assume audience has read proposal or updates (or remembers your pitch)

• slides uploaded
  – to Canvas Assignments: Final Presentations
  – post your slides by 6pm if using your laptops (best), or by 11am if using mine

Code / Video

– required but not posted: code including README
  – so I can see what you’ve done, but I will not post
  – includes README as a root with brief roadmap/overview of organization
  – which parts are your code or libraries
  – how to compile and run
  – I do not necessarily expect your code compile on my machine

• encouraged but not required
  – submit live demo URL
  – open-source your code (if so, fine to just send me that URL)
  – submit supporting video
  – with or without voiceover

– very nice to have later, software bitmap makes demos last not forever!
  – can be same or different from what you show in final presentation

Code / Video

• Idiom pitfalls
  – Unjustified Visual Encoding
  – Preclude clear problem statement and encoding!
  – Idiom: Hammer In Search of Nail
    – should characterize capabilities of new technique if proposed in paper
  – Color Cacophony
    – avoid blatant disregard for basic color perception issues
    – huge areas of highly saturated color
    – categorical color coding for 15+ category levels
    – redundant without luminance differences
    – encoding 3 attributes with RGB

• Rainbows Just Like In The Sky
  – avoid hue for ordered attribs, perceptual nonlinearity along rainbow gradient

• not obvious
  – diverged from original goals, in retrospect

• Determined everything
  – don’t assume target audience (if not convinced)
  – don’t leave them implicit, it’s your job to tell reader explicitly!

• Stealth Contributions
  – don’t leave them implicit, it’s your job to tell reader explicitly!
  – consider carefully, often different from original project goals

Final presentations marking

• last year’s template
  – Intro/Framing:
    – Man
    – Limitations/Critique/Lessons:
    – Style
    – Demo/Video:
    – Timing
    – Question Handling
  – Slides:
  – Style:
  – Demo/Video:
  – Timing:
  – Question Handling:

Final presentations: Tue Dec 13 3-7 (?) FSC 2300A

• Process & Pitfalls for InfoVis Papers

• ASSIGNMENTS: Final Presentations on Canvas
  – upload due Fri Dec 13 11:59pm
  – required & posted report, showcase image
  – required but not posted code including README
  – encouraged live demo URL, video

• Come talk!
  – encourage meeting with me to get advice/feedback before final present
    – chance to get feedback while you can still act on it
    – optional, not mandatory
    – do send email to schedule, can’t meet with all 19 teams in last few days!

Final presentations marking

• last year’s template
  – Intro/Framing:
  – Main:
  – Limitations/Critique/Lessons:
  – Style:
  – Demo/Video:
  – Timing:
  – Question Handling:

Final pitfalls: Style

• Deadly Detail Dump
  – explain why and what, provide high-level framing before low-level detail

Final pitfalls: Tactics

• Stealth Contributions
  – don’t leave them implicit, it’s your job to tell reader explicitly!
  – consider carefully, often different from original project goals

Final pitfalls: Strategy

• What I Did Over My Summer Vacation
  – don’t focus on effort rather than contribution
  – don’t be too low level, it’s not a manual

Summary 50%, Analysis 25%, Critique 25%

• Bad Slice and Dice
  – two papers split up wrong
  – neither is standalone, yet both repeat

Summary 50%, Analysis 25%, Critique 25%

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Summary 50%, Analysis 25%, Critique 25%
Reproducibility: Levels to consider

- paper
  - post it online
  - make sure it stays accessible when you move on to new place
- internal archives are better yet (versioning)
- algorithm
  - well documented in paper itself
  - document further with supplemental materials
- code
  - make available as open source
  - pick right spot on continuum of effort involved, from minimal to massive
  - just put it up works and all internal documentation
  - well documented and tested
  - (build a whole community - not the common case)

Why bother with reproducibility

- moral high ground
  - for Science!
- enlightened self-interest
  - make your own life easier
  - you'll be cited more often by academics
  - your work is more likely to be used by industry

Reproducible research

- 5: 15 minutes with free tools
- 4: 15 minutes with proprietary tools
- 3: considerable effort
- 2: extreme effort
- 1: cannot seem to be reproduced
- 0: cannot be reproduced

Reproducibility: Levels to consider, cont.

- data
  - make available
  - technologic methodology/data used by system
- results: visualization specific
- encoding: visualization specific
- strategy: all research
- tactic: all research
- results: visualization specific
- style: all research, except
  - Story-Free Captions, My Picture Speaks For Itself

Reproducible and Replicable Research

Reproducibility: Levels to consider, cont.

- data
  - make available
  - technologic methodology/data used by system
- results: visualization specific
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View from industry

- Increasing the Impact of Visualization Research panel, VIS 2017
  - Kris Kwongsheokas, Data Visualization Science, Twitter
  - Relevent Research in Signal Processing - What, why, and how

Replication: crisis in psychology, medicine, etc

- early rumblings left me with (ignorable) qualms
- papers are most published research fraud! Swartz Deliver Babies (p= 0.008), The Earth is spherical (p < 0.05), False-Positive Psychology
- groundswell of change for what methods are considered legitimate
- out-of-QRFs (questionable research practices)
  - p-hacking / p-value fishing / data dredging
  - Hypothesizing After Results are Known (HARKing)
  - study replication
  - pre-registration
  - buồnhita with minimal responses
  - some people doubting down and defending previous work
  - many willing to repudiate (their own) earlier styles of working

Remarkable introspection on methods

- thoughtful willingness to change standards of field
  - Andrew Gelman’s commentary on the Susan Fiske article
- Simine Vazire’s entire Sometimes I’m Wrong blog
  - http://siminevazire.wordpress.com/
  - especially posts on topic Scientific Integrity
- Joe Simmons Data Coops blog post What I Want Our Field to Prioritize
  - http://StatsChat.com/53
- Dana Carney’s brave statement on her previous power pose work
When and how will this storm hit visualization?

• they're ahead of us
  – they have some paper retractions
  – they agonize about difficulty of getting failure-to-replicate papers accepted
  – they hardly ever try to do such work.
  – they are a much older field
  – we're younger: might our power hierarchies thus be less entrenched?
  – they are higher profile
  – we don't have research results appear regularly in major newspapers/magazines
  – we have rich fabric of blogs as major drivers of discussion
  – crosscutting traditional power hierarchies
  – we have fewer active bloggers

• replication crisis was focus of BELIV 2018 workshop at IEEE VIS
  – evaluation and BEyond - methodoLogIcal approaches for Visualization

http://beliv.cs.univie.ac.at/