CS4040: Writing

Ehud Reiter

Content

- **Academic Writing**
- Paper Sections
- Writing Process
- CS4040 Report

Academic Writing

- Technical writing, which presents scientific evidence.
- Serious and factual
  - » No emojis, jokes, etc
- Often many figures and graphs

Academic Style

- Concise, clear and coherent
  - » Explicit
  - » Text flows
  - » Clear transition and cohesion
- Academic language
  - » Technical vocabulary
  - » Usually avoid I / we

Language

- Use adjectives/adverbs frugally
  - » Do you need to exaggerate everything?
    - – “Very innovative”, “extremely interesting”
  - » Don’t repeat (say things once)
- Ex: “completely and utterly alone” just means “alone”
  - » Don’t just fill your findings with hedging
    - – “Suggests”, “may”, “possibly”
  - » don’t be insulting or demeaning

Opinions

- Can give opinions but must back it up with data and logical arguments
- Weigh up the information
  - » Is it valid?
  - » Is it important?
- Integrate the identified information into your own argument

Diagrams

- We expect to see diagrams and charts
  - » Especially for experimental results
- Keep these simple
  - » Complex diagrams can be hard to understand
  - » https://ehudreiter.com/2025/10/08/good-diagrams-for-research-papers/

Previous work

- Its fine and indeed expected to repeat information and findings from previous papers
- Must be properly cited and referenced!

Academic Writing

- You are responsible for making the meaning clear!
- Explicitly transition between ideas
  - » within the paragraphs and sections
  - » between the paragraphs and sections
- Don’t just ramble
- Don’t interrupt subject-verb connection
- Point, evidence, explain!

Academic Writing

- Best way to learn the style is to read published research papers

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Sections of Academic Paper

- Abstract
- Introduction and research question
- Related work
- New algorithm, system, etc
- Experimental design and hypotheses
- Experimental results
- Discussion, future work, conclusion

Abstract

- Very short summary of paper
  - » Typically 100–200 words
  - » What is the research question?
  - » What is the contribution of this paper?
  - » What are the key results?
- Catch people's interest, so they decide to read the paper

Introduction

- Sets the scene for the paper
  - » Including motivation for this research
- Summarises research question, alg/sys, experiment
- Present overall big picture
  - » Makes it easier for readers to understand details
- Maybe 10% of overall paper?

Related Work

- Summarises most important related work in previous papers
  - » Gives summary, doesn't just cite
  - » Relate to what you're doing
- Shows reader you are aware of what other people have done in this field
- Makes it clear what your work builds on

New Alg, Sys, etc

- Describes your new algorithm, system, methodology, or whatever
  - » Can call this section Algorithm or System
- High-level description at design level
  - » Implementation details if important
- CS4040 project: describe algorithm or system you are evaluating

Experimental Design

- List specific hypotheses being tested
- Describe the experiment you use to test these hypotheses
  - » Give details. Eg, if you use human subjects, say how many and how you recruited them

Replication

- Ideally, sufficient information is given to allow someone else to repeat your experiment
  - » Your system is accessible or open-source
- If insufficient space in paper, write a tech report which gives sufficient detail
  - » Not expected for CS4040 report!

Results

- Give results of experiment
  - » Usually in figures or tables which present numbers
  - » Include statistical tests
- Present (qualitative) error analysis
  - » Why algorithm perform badly in some case

Discussion

- Discuss what you think your results mean, and issues they raise
  - » If your results are negative, don't hide this!
- Many readers will skip details of experiment and results, and just read the discussion
  - » So ideally is self-contained

Future Work, Conclusion

- Future work: what additional research you would like to do (if any) to follow up on your findings
  - » High-level, not detailed description
- Conclusion: Summarise key findings and insights

CS4040 Reflections

- For CS4040, include reflection in your conclusion
  - » What worked well
  - » What did not work well
  - » What you do differently if you were to start all over again.
- Not usually part of a research paper!

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Getting started

- Hard for many people
- One approach is to write an outline, and expand it
- Another is to use “mind mapping” tools
- Or just start writing…
  - » Often write abstract, intro, conclusion last

Writing paper

- I usually do a rough first draft
  - » The hardest step!
- Then repeatedly rewrite and improve until I am satisfied
- Then ask colleague to read and critique
- Then revise based on their comments
- Final step is proof-reading

Citations

- Used to justify statements in the report
- It's about spotting the gaps in your writing:
  - » what would a new reader need to look at if they doubted what you say about the field
  - » who first introduced an approach you're talking about

Citations: Example

Brown et al (2020) showed that the GPT3 large language model could perform tasks simply based on a prompt, without any task-specific training or fine-tuning.

Comments

- I give papers to colleagues for general comments and feedback
  - » Usually very valuable
- Give colleagues enough time
  - » Don’t expect feedback in 1 hour

Proof-reading

- Use spell-checker (in overleaf)
- Get friends to check for mistakes
- Spelling and grammar mistakes give readers a poor impression!

Generative AI

- Do NOT ask ChatGPT (etc) to write paper for you
- OK to use ChatGPT for
  - » brainstorming tool to get started
  - » Proof-reading
  - » Improving writing
- Content must come from you!

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CS4040 report

- Review expected content and marking criteria (on MyAberdeen)

Example CS4040 Projects

- Available on MyAberdeen

Questions?