

# The Process: Running Experiments, Writing, Presenting

LING575 Analyzing Neural Language Models

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# Running Experiments

# Getting Started

- As soon as possible (all in your shared repo):
  - Find/build code to read your data
  - Find/build evaluation code
    - If you're using e.g. diagnostic classifiers, use existing libraries' evaluations
    - For some analysis projects, this might be harder to find
  - Get simplest version possible of pipeline running (e.g. one pre-trained model)
    - Play with very small / toy data, etc., so you can iterate quickly

# Experiments

- Main point: **log everything!!** (Think: modern lab notebook.)
- For each experiment, record (e.g. in a spreadsheet):
  - Command ran
    - Any relevant parameters included here
      - *Including random seeds!* (specify via command-line or, e.g. in AllenNLP config)
    - [NB: `allennlp train` writes the conf to the serialization dir]
  - Git checkpoint used
  - Notes on why you ran / what the outcome was

# Iterate

- Once the basic infrastructure is setup, research becomes an “anytime algorithm”
- Submit condor jobs, wait, log / analyze results, think about what to do next
- Your future self will also *very strongly* thank you for keeping detailed records
  - Very helpful when writing

# Writing a Paper

# Typical Format

- Conference papers: eight (or four) pages, two-column ACL format
- Sections:
  - Introduction
  - Related Work (possibly later)
  - Model/proposal
    - Data
    - Experimental setup
  - Results
  - Discussion
  - Conclusion (future work / possible follow-ups)

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- Rational Reconstruction: “You don't present the actual history that you went through, but rather an idealized history that perfectly motivates each step in the solution. ... The goal in pursuing the rational reconstruction style is not to convince the reader that you are brilliant (or addle-headed for that matter) but **that your solution is trivial**. It takes a certain strength of character to take that as one's goal.”

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- It's a story, but the characters are ideas, not people (not you, not previous researchers).

# Introduction

- 1-2 paragraphs general setup + motivation
  - Somewhat general, but with some citations to prior work
  - Culminating in your main research question / hypothesis
- 1 paragraph summary of main contributions and results of your paper
  - How you're advancing the state of knowledge just described
- 1 paragraph “sign-posting” the rest of the paper
  - More than just “Next is methods, then results, then discussion.”

# Related Work

- Brief discussions of prior research that's related to your paper
- NOT a mere summary of everything that's come before
- Should be used as part of motivation:
  - Limitations in prior work
  - Differences between it and yours
- (If this is hard to do without seeing your results first, *can* be put towards end of paper.)

# Model / Proposal

- Goal: a researcher in the field should be able to roughly reproduce your experiments from reading this section
  - Complete reproducibility details can be in appendices / code repositories
- Describe: datasets, models, evaluations
  - Citing existing examples when possible
- Include math only if necessary for understanding, not for its own sake
  - Some tips for formatting



Colin Raffel  
@colinraffel

Hot take: Mathiness [1] is like an adversarial patch [2] for ML conference reviewers: Mathiness causes a reviewer to classify the paper as "accept" regardless of whether the math is useful/valid and the paper is any good. [3] Fig. 6 has some empirical evidence of this. (refs [↓](#))

9:45 AM · Jan 23, 2020 · [Twitter Web App](#)

# Results

- Tables, elaborating your evaluations in your different conditions
- Ideally:
  - Comparisons to baselines (when applicable)
  - Several runs / random seeds (avg plus std)
- Guide the reader through the main take-aways: tables are hard to read!



# Discussion

- What do we learn from the results?
- Frame in terms of your motivating question / hypothesis
- A great place for some *qualitative analysis*
  - Example outputs
  - Suggestions for what might be causing results

# Conclusion

- One sentence re-iterating the design
- Drive home the take-away message; make sure the reader knows what the main point is
  - Repetition is not a bad thing!!
- Finish with future work / next directions
  - Not necessarily what you are going to do, but what kinds of questions this work opens up

# Publishing and Presenting

# From course to conference

- Course papers are “proto-papers”
  - Ask the right question / formulate the right hypothesis
  - Preliminary results with suggestive conclusions
- Paper:
  - More thorough controls / experiments
  - Detailed analysis and discussion
- Think in terms of “audience design”: who’s the intended reader, and how can you convince them to be excited about your project

# Abstract

- Open with broad overview: glimpse of the main problem
- Middle: elaborate, by connecting with the central results of the paper
- Finish: link the results with broader questions / implications
  - So reviewer / reader can easily answer: does it make a substantive / original contribution

# Venues

- Major conferences: ACL, EMNLP, COLING, CoNLL, CogSci, AAAI, ICML, NeurIPS, ICLR, ...
- Upcoming:
  - Not many announced yet, but usually Summer deadlines are
    - AAAI
    - COLING
    - CoNLL
    - BlackboxNLP [August 5]

# Venues (cont)

- While there are obvious time pressures for your CVs, *there's always another conference*
  - Do the best work you can, find the right home for it
- arXiv: in general, do post there; the CL/NLP communities follow it
  - But: don't rush! It can become authoritative, impact your reputation
  - Check: anonymity periods of major conferences
    - EG: ACL doesn't allow posting within one month of deadline, and no major advertising on social media of arXiv papers

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- Reviewers provide comments
- Authors respond
- ...
- Decisions made
  - NB: rejection is the mode!! Many hard decisions have to be made; often feels arbitrary. Nothing to be ashamed of. Try and try again.

# What Reviewers Do

- ACL form, almost entirely:
  - What is the paper about? Main strengths and weaknesses?
  - Reasons to accept
  - Reasons to reject
  - Overall recommendation (numeric)
  - Reviewer confidence (numeric)
  - Feedback for authors:
    - Questions
    - Missing references
    - Typographic
  - Ethics review
  - Reproducibility score

# Presentations



# Basic Structure

- Mirrors paper, but briefer
- Beginning:
  - What problem? Why is it interesting? Why have previous solutions failed?
- Middle:
  - Data, model, evaluation
- End:
  - Results, what techniques contributed the most, *examples*

# Pullum's Five (Six) Rules

- Don't ever begin with an apology
- Don't ever underestimate the audience's intelligence
- Respect time limits
- Don't survey the whole damn field
- Remember that you're an advocate, not the defendant
- Expect questions that will floor you

# My Guiding Principle

- The audience is intelligent, but also tired. And you are the expert on your own work.
- *Your talk will be amazingly successful if each audience member can remember **one thing** from it.*
- So: make compelling figures.
  - Don't be afraid to be repetitive: they're hearing this for the first time and you're an expert. Tell them the take-home message a few times.

# Practical points

- Turn off notifications
- Make sure your screen stays awake
- Shut down running applications
- Make sure desktop/browser/anything is free of content you don't want the world to see
- If using Google Slides/Keynote/Powerpoint, make a PDF backup

# Q&A

- Mainly: make the audience feel like their question has been addressed.
- Try to view it as joint inquiry, not an interrogation.
- Pause before answering
- Be honest when you don't know.
  - But say more than “I don't know.” Add “but...” Or “That reminds me of...” “One thing that suggests to me...”
- Questions don't always make sense. Try to bend it into something that does and that makes the questioner feel valued. Everyone will love you.

# Next Time

- Special Topics presentations!
- Reminder: everyone is expected to contribute to the discussion. Come to class having done the suggested readings.
- I will post more explicit guidelines about final papers soon.