

Start recording ...

Admin

- **Draft due March 24th**
- Session moderators for today: **Plop, Daniel**
 - https://docs.google.com/spreadsheets/d/1dbmlvduupZUCDjxU4HW2_350OVrVG-g1FoEAG-uWhMk
- Speakers feel free to share your pdfs of your presentations with me

Plan

- **One talk today:**
 - Mehran Taghian
- One 40 min slot, including 10 to 20 mins of questions / suggestions
- After that:
 - Project draft expectations
 - Scientific Writing

Your draft is due next week!

- Should be a complete paper, with placeholders for missing experiments
- What is a complete paper?
 - A complete introduction, with most of the literature survey complete
 - A complete background and any required technical sections
 - A complete write-up for the goals of the experiments
 - For experiments: specify the hypotheses and questions you seek to answer
 - environments and the experiments you plan to run (algorithms, baselines, evaluation scheme)
- There should be at least one complete experiment in the draft

What is a complete experiment?

- The question and purpose of the experiment is clear and well motivated
- The empirical setup is described such that replication is possible (remember we talked about using tenses to write about experiments)
- The data and plots are presented well
- The conclusions from the experiment are clear and defensible
- You need this for *only* one experiment...you can do more...

The draft is all about feedback

- Each of you will review 2 other projects (remember you will be marked on reviewing....more on that next week)
- Each project will get 4 student peer reviews
- Each project will get comments from me or one of the TAs (Archit and Andrew)
- Your job is to make use of that feedback to make your project awesome

Draft marking

- Like reviewing and generally evaluating anything marking is subjective
- I will follow these principles:
 - Did you follow the practices and methodologies we have discussed in class?
 - With a couple months more work, could this be part of a NeurIPS paper?
 - Does this look and read like an academic paper?
 - Was there effort and pride put into the work?

**How does one make a
paper that looks like a
conference paper?**

Write well

Writing is hard, assume the reader is barely following at all times

- **The reader cannot ask you questions as they read: this is your one shot to convey your ideas and messages**
- You are too close to the work
- So you forget to say the simple and obvious things to you: try to figure those things out and say them
- Never underestimate how people can misunderstand another's writing
- Never underestimate how two people can think one paragraph can mean totally different things

General advice

- **Writing is about structure**
- Write a topic sentence
- Make sure each paragraph has one idea
- Say important things first
- Be direct and say things as plainly as possible

Be sincere

- Be sincere about what you are trying to do in the paper
- You have to care about what you are doing, and your writing will reveal when you don't!
- Think about: what do I really want to communicate here?
- If its not clear in your mind what you want to say, then what you write down will not be clear
- Writing is also for you: it makes you question your work which makes the work better

Scoping your work

- Clearly identify the problem setting: exactly what problem are you addressing and for what specific setting?
- This also helps narrow the scope, to constrain related work
- Example:
 - Too vague: We care about policy evaluation algorithms
 - More specific: We care about online off-policy policy evaluation algorithms that are sample efficient

Placing your work

- Tell us how it fits into the body of prior work
- Don't just list things that seem related
- Talk about the history of the problem or idea
 - Where previous efforts ended and what are the natural next steps and open questions
- This can always be done in a positive and constructive fashion

Writing an introduction

- State your problem. As early as possible: *what this paper is about*
- Explain what has been done
 - It is usually better to include your literature survey here, instead of in a separate Related Work section
- Identify a specific open question, and how/why it hasn't been done
 - ...also why its hard, interesting and not already done
- Explain what you do and key contributions

Minimalist and Just-in-time

- Don't talk about things that are not relevant to your topic, to your contributions, to your insights, and to your reader
- Tell the reader what they need to know, only when they need to know it
- This means leaving out certain related works
- This means talking about certain ideas and related work later when you need it

Are Related Work sections bad?

- This usually just turns into a list
- Example:
 - Here is all the methods that are used for exploration with FA
 - And now here are all the methods that are for this other problem
 - And this why they are all bad
- This often becomes negative, less connected ideas and problems
- **NEVER EVER: put related work at the end**

Abstracts

- Mini version of the intro, which is a mini version of the paper!
 - Structure and repetition are important
- **To start:** take the topic sentence from each paragraph in the intro
- **Better:** Keep the same structure as the intro, but make it more succinct
- It is ok to make bold statements in the abstract, without substantiating it, as long as the paper substantiates it
- Very early in the abstract, ideally line one, tell us what the paper is about

Technical sections

- Be precise. Make sure all variables are defined, and used consistently. Clearest evidence of amateur or sloppy work
- Adhere to your notation budget. Try to limit how much notation needs to be introduced.
- Correctness is king. Do not add math/theory unless its (a) stated precisely and (b) you're confident in it
- Background section should define the problem setting formally and any notation you will need later in the paper
- I should never come across a symbol later in the paper that was not defined

Be consistent, be boring

- At least at first
- Don't use a different word or phrase for the same thing to spice things up
- Hunt for consistency issues in your document: e.g., interchanging “method”, “algorithm”, “agent”
- Don't use flowery, over the top language: called **purple prose**
- Don't use words like “very”, “extremely”, “interestingly” to make your prose more impactful. Improve the content instead

Experiments

- Make sure you communicate to your self: do the results convince you? Be a sceptic of your own work
- Make clear design decisions, and justify them:
 - If you are embarrassed or not wanting to write down some of the details of your experiment that should be a warning sign!
 - Example: hmm this choice was a bit arbitrary, so I am going to make up a reason why I choose this parameter or this environment
- Tell us about we learned from the experiments
- We have talked about experiments a lot by now. Any additional questions?

Edit, Edit, Edit

- You have to be willing to throw it all in the garbage
 - I often delete sentences, paragraphs and sections...multiple times
- Be your own reviewer
 - Question everything; anticipate questions the reader might have
 - Did this paragraph convey what I wanted? What was this paragraph or section even about?
 - Is this idea concisely explained? Remove extra words and phrases
 - Could I completely re-organize this to get it across better?

Small things

- Watch out for backward sentences: say the most important thing first
- Don't define acronyms that you only use once
- Don't use lists too much
- Don't use meaningless or irrelevant words (“modern” RL algorithms, “popular” optimizer)
- Avoid meaningless motivations: we work on this because everyone else is
- Related work: talk about ideas and methods not people
- The reference should not be part of the sentence: “As in [Sutton et al, 2004] we ...” BAD

Small things

- Read your sentences and ask yourself: “is this true?”, often times its not—sloppy prose
- Wrong subject for verb: “Reinforcement learning tries to solve”, RL is a formalism, it cannot be trying something. This is literally not true!
- Ask yourself: could the opposite of this sentence also be true?
- Avoid long sentences. The reader forgets halfway through
 - Short punchy declarative sentences are easy to read

Small things

- Focus on what you **do**, not on what you **do not do**
 - “In this work we do not investigate planning, rather we focus on policy evaluation” << Backwards sentence also
- Avoid overclaiming, and only state factually true things
 - “Our method X is better than method Y” -> “Our method X performs statistically significantly better than method Y on this problem”
- Be precise!
- Don't use silly names. Research can be fun but papers should be serious and professional—no place for jokes or informality

Small things

- Watch out for false parallelism in lists
 - “There are many possible approaches to exploration including (1) optimistic initial values, (2) upper confidence bound actions selection,…” all list items should be the same type
- Don’t use **bold** or **colours** to emphasize things
- Be consistent with British vs American spellings
- Avoid strong words like “must”, “requires”
 - Avoid strong statements...they are often false

It takes time ...

- Find good writers and study how they craft intros and their general writing style
- Learn from demonstration
- Practice, Practice, Practice
- Remember writing is hard for all of us, and many good writers don't enjoy it!

Links to resources

- Strunk and White is the classic reference book
- Other stuff:
 - <http://approximatelycorrect.com/2018/01/29/heuristics-technical-scientific-writing-machine-learning-perspective/>
 - <https://icml.cc/Conferences/2002/craft.html>