ORIE 7391: Faster: Algorithmic Ideas for Speeding Up Optimization

How to Give a Talk

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Outline

Tell a story

- what's the problem?
- preview your result
- what solutions have others tried?
- how does your idea work? and how is it different from previous work?
- gory details / theory / how it works
- applications / experiments / numerical evidence
- now what?

Inspiration for this meta-talk: Heilmeier Catechism

Heilmeier (DARPA director in 1950's) taught that grant proposals should include:

- What are you trying to do? Articulate your objectives using absolutely no jargon.
- How is it done today, and what are the limits of current practice?
- What is new in your approach and why do you think it will be successful?
- Who cares? If you are successful, what difference will it make?
- What are the risks? How much will it cost? How long will it take?
- What are the mid-term and final "exams" to check for success?

for a talk, switch all these to the past tense

What's the problem?

kinds of problem

- a real problem (whose?)
- an "open" problem (why does it matter?)

pro tips:

- you'd better "solve" the problem by the end of the talk. . .
- pictures help grab attention

Preview your result

state your contribution

- so audience understands what you did
  (and can decide to pay attention or not)
- maybe a theorem, maybe a picture, maybe in words
- might require introducing some key definitions

pro tips:

- leave caveats for later
  (but mention now if they're major or minor caveats)
- no one will listen any more if this part is confusing

What solutions have others tried?

why compare to related work?

- shows audience how hard the problem is
- helps audience understand what you did (and what you didn't do)
- keeps your colleagues feeling collegial

pro tips:

- cite all authors by name if ≤ 3 authors
- maybe:
  - use your initial instead of name (eg, Kallus and U 2018)
  - bold your name (eg, Kallus and **Udell** 2018)

How does your idea work?

- this section is usually longest
- divide into subsections to explain parts of your approach
- by the end, the audience understands **why** your idea works
- use **as little** technical machinery as possible
- provide intuition

pro tips:

- provide quick high level overview **and** details
- so non-experts **and** experts understand how it works
- imagine the first year PhD student in the audience

Gory details

- now you can impress people and lose them
- make it clear you have technical chops
- make the experts think you're smart
- but none of this matters
- because the audience already understands
- the important ideas

pro tips:

- omit this part from a public talk
- possibly also omit from a colloquium
- definitely include in a job talk
- probably include for this class, to build endurance
- you can skip this if your talk is running over

Experiments

- prove that your ideas work
- show that they yield a useful solution
- and that they actually solve the problem

pro tips:

- ask for people to restore their attention (after gory details)
- make experiment slides self-contained
  - state experimental settings, label axes and curves clearly, ...

Know your audience

imagine your audience

- what do they know already? what will they find surprising?
- often helps to imagine writing the talk for **one particular person** who you know well
- while giving the talk, look at the person whose face is giving feedback
- (while listening to a talk, **be** the person giving feedback)

it's ok to lose (some of) your audience

- but you should plan for **who** you'll lose and **when** you'll lose them
- generally, everyone should understand everything except for the "gory details"
- afterwards, tell people when to start paying attention again

Concluding

- state conclusions
- state research directions
- provide references
- ask for questions

Style

technology

- LaTeX/ beamer presentations are common in optimization
- powerpoint / keynote more common in machine learning
- google slides for collaborative development
- theorists can make slides that contain only words, equations, and plots
- systems presentations usually come with fancy pictures and animations

length

- rule of thumb: one minute per slide
- more if there are lots of pictures
- less if there's lots of math to explain
- have sections you can cut easily: gory details, applications
- know at what time you should arrive at each section

Style

words

- brevity is the soul of wit
- don't distract your audience
- use bullets, not paragraphs
- beware of line breaks
- pick a convention and stick to it
  - capitalization, punctuation, phrases vs sentences, etc

equations

- define your terms
- define as little as possible
- use words instead of symbols where possible

Style

animations

- must have semantic meaning

delivery

- speak slowly and clearly
- require the audience to ask questions
- show that you're a human
  (humor, look at audience, ask questions, stop to think)
- get ready for improvisation!

Style gotchas

every bullet should be of the same type

- examples
- applications
- properties
- steps of algorithm

text above and/or below contextualizes bullets

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definitions

- should be typeset clearly so readers know what to remember
- use formatting to show what is being defined
- define terminology before using it
- provide a name for every variable (and use both!)

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title

- is best compression of takeaway from slide
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slides are for your audience, not for you

- they are not a script
- they should not distract audience from what you say
- they should help audience organize and make sense of what you say

Professionalism

- arrive 15 min (or more) early to set up
- bring (and test) your A/V equipment
  - dongles, presenters, power cord *etc.*
- look the part
  - dress one notch more formal than the audience in your venue
  - make it easy for your audience to pay attention to your talk
    - your face should be easy to see
    - your clothes should not be distracting

More resources

- scientific writing
- presentations

Outline

What's in a presentation for this class?

every talk for this class should contain

- two quiz questions about the reading
- a nice bit of math you want to teach
- some results from the paper you want to highlight
- questions to discuss

Checklist for presentations

before the talk

- submit a PR to the class git repo with your slides

bring

- power
- dongle (for HDMI or VGA)

setup

- projector
- camera
- zoom
- share screen

Outline

Reviews

five paragraphs

- summarize the paper
- high level (subjective) evaluation
- high level criticisms
- detailed line-by-line comments
- summary of review

Summarize the paper

objective description of the paper

- explain the idea of the paper and its contributions
- use your own words (so the authors can learn something!)
- be neutral

High level evaluation

sujective comments on the paper

- is it well written?
- is it original or incremental?
- are the claims supported by theory/experiment?
- who will be interested in these results?

High level criticisms

(more) objective criticisms

- does the approach make sense?
- are there major errors or omissions?
- are the claims supported by evidence?
- provide a suggested **fix** for every problem you identify
- be polite!

Line by line comments

moving line by line,

- when were you confused?
- were there mistakes in notation, typos, errors, grammatical mistakes?
- were any figures difficult to understand?
- missing references?