

ORIE 7191: Optimization for Machine Learning

How to Give a Talk

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January 8, 2022

Outline

How to Give a Talk

How to write a review

Homework

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 items that last year's class forgot

every bullet should be of the same type * examples * applications * properties * steps of algorithm text above and/or below contextualizes bullets

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!)

title * is best compression of takeaway from slide

text that overflows one line is suspect * consider breaking into bullets, definitions, ... * 1 line of text requires a very good reason

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

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!

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

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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

subjective 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?

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- ▶ register
- ▶ sign up for slack
- ▶ mark 3 papers you'd like to present by midnight Friday on
paper selection google doc

Scheduling talks

- ▶ I'll assign paper presentations this weekend
- ▶ students will upload their assigned paper to CMT
- ▶ students will bid on papers to review