EBERHARD KARLS
UNIVERSITÄT
TÜBINGEN

machine learning
new perspectives
for science

How to give a good presentation

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AutoML for Science

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Some parts of this presentation are adapted from a seminar hold by André Biedenkapp, with permission.

Why should you aim for a good presentation?

→ You'll have to give a lot of presentations in your life (in academia **and** industry)

Such presentations can decide whether

- You get a job
- You get a promotion
- Your favourite project gets funded
- You get the resources you need
- …
- You get a good grade ;-)

Photo by Matthew Jungling on Unsplash

A few simple rules

1. Structure is key
2. Adapt your talk to your audience
3. Present in pictures
4. Readable slides
5. Descriptive Titles
6. Practice, Practice, Practice!
7. Check your technical equipment before
8. Behave naturally
9. Learn from others

#1 Structure is key

High level to low level to high level

- Catch your audience's attention
- Then tell them what you'll tell them and why they should care (priming)
- Then tell it to them
- Then tell them what you just told them

Make transitions clear, don't forget the "meta-talk"

- Example: "*In order to explain X, first I'll need to explain Y" or "Now that we've seen X and Y, we have the ingredients to do Z"*
- Use a recurring slide to remind your audience where you are

Don't get lost in details

- In case of doubt **leave out some details**
- Use a "T-structure": combine broad coverage of a topic with depth about one aspect
- Focus on what **you** find most interesting

⭐ Bonus tips

- have backup slides with left out details / experiments / methods

#1 Structure is key

Start your presentation with

- a brief introduction of yourself
- a motivation of why your topic matters and why the audience should care
- what you will talk about (outline slide only for >30 mins)

End your presentation with

- the main takeaways
- a lookout
- a clear statement announcing the end of your presentation, e.g. *That‘s it from my side and now I am happy to answer questions*
- a Thank-you slide is not necessary, better show the conclusion/discussion slide (unless you thank collaborators)

#1 Structure is key

Example structure

introduction high-level

1. motivation [2min]
   → why is this needed? what is the limitation of previous work?
   → connect to other work (also in this seminar)?
2. contributions [2min]
   → what is novel? how does the paper add value to the field?

main part low-level

3. method [8min]
   →how does it work?
4. results [5min]
   → how well does it work?

outro high-level

5. strengths / limitation of the approach [2min]
   →when does it fail, is there a bottleneck, problems in practice, weak empirical evaluation
   →how is it better than previous work, when does it work well?
6. conclusion [1min]
   → main take home message

#2 Adapt your talk to your audience

The paper you are presenting is written for a specialized research community.

In general

- A talk to the CEO is completely different than one to the tech support group
- A talk applying method Y to domain X is completely different when you're talking to community X or Y

Consider the background of your audience

- "Customize" the motivation
- Cover the necessary background
- We are experts on some topics – don't bore us with what we already know

⭐ Bonus tipps

- Connect your talk with the other talk in your slot, e.g. using the same method / addressing the same problem
- Connect your talk to the overall topic of the seminar

Slides full of text are hard to follow

- The audience will read and **not listen to you**
- Reduce text, use **more images**
- Use animation only to guide focus of attention

Method of Choice: Bayesian Optimization

- Prominent approach to optimize expensive blackbox functions [Mockus et al., '78]
- Approach
  - Observe a few function evaluations
  - Construct a probabilistic model of the objective function, for example a Gaussian process
  - Use that model to compute a so-called acquisition function that quantifies how useful a new data point is, trading off exploitation of areas predicted to be good and exploration of areas where the model is uncertain
  - Use the acquisition function to select the next point to evaluate the function at
  - Evaluate the function there, refit the model, and iterate
- Efficient in the number of function evaluations
- Works when objective is nonconvex, noisy, has unknown derivatives, etc
- Recent convergence results [Srinivas et al, '10; Bull '11; de Freitas, Smola, Zoghi, '12]

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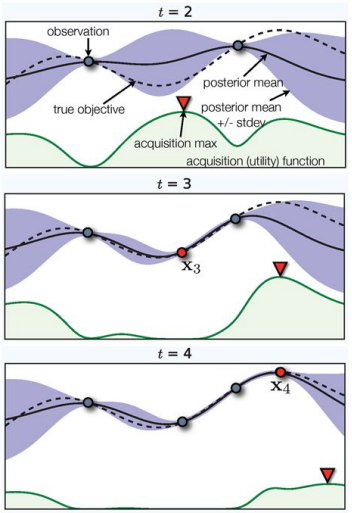

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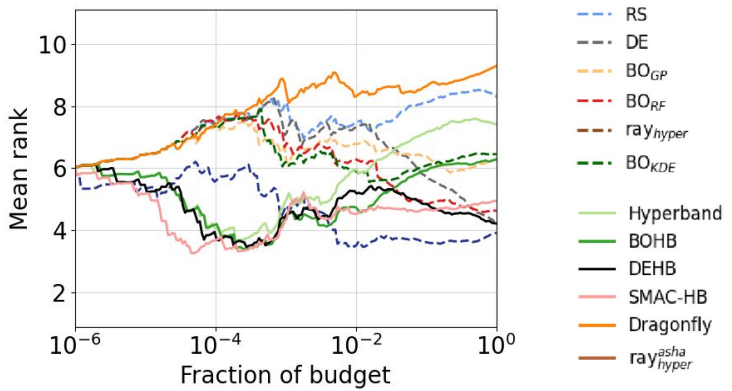
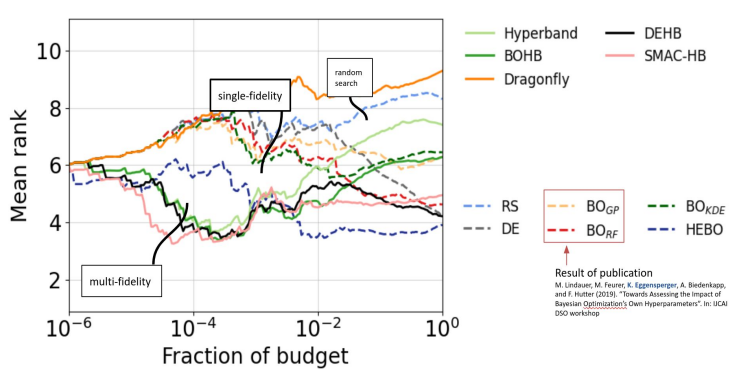
#3 Present in Pictures

How to present a graph/plot?

- always explain what the graph shows
- use presenter to guide audience
- take enough time

→ The same applies to equations and tables





#4 Readable slides - some tips

Text, Font & Color

1. Make sure to pick a reasonable text and background color
2. Can you read this? Also from the back? Remember, the contrast and resolution of your laptop is usually much better than that of the projector
3. Sometimes the font size is too tiny. This also applies to axis labels.
4. Pick a single font type and color and use it throughout *the whole presentation*
5. Highlight important **keywords** when there is a lot of text, but: choose a consistent *way* of highlighting

Graphics

1. Size up figures to use most of the slide.
2. Not all animations are useful.
3. Screenshots are okay, if you do not have access to the original image.

Other

1. Meke sure tere are no typos in yur slides
2. A list needs more than one entry
   - e.g. this is not a list!
3. Make sure slides are self-contained (important for most presentation types)

#5 Descriptive titles

The title of your slide should be **informative**, e.g.

a. Motivation
b. Method
c. Experiment / Results
d. Future Work

a. Why LLMs should support data scientists
b. How to find the right prompt matters
c. Experiments on a Kaggle competition
d. Next step: Automatically win Kaggle competition

⭐ **Bonus tipps**

Before you start creating the first slide:

- Write down the main messages (~20 short sentences = one slide per minute)
- Create slides to support the message

#6 Practice, Practice, Practice

1. Plan each part!

- Have a time budget
- Have bullet points with the main points
- Practice & check the timing for the part

2. Put it all together and practice!

- Do the transitions work?
- Always get stuck at the same point? Change that point!
- Don’t speak too fast! Speaking too slowly is almost impossible
- Make use of breaks

3. Finetune start and beginning!

- Know how you want to start (when you’re most nervous)
- Know how you want to end (what the audience remembers)

⭐ Bonus tipps

- Practice starting at a random slide of your presentation
- Stand and use presentation mode (as realistic as possible)

#7 Check your technical equipment before

Checklist

- Do you have to bring your own laptop?
  - Does your laptop work with the projector?
  - Do you have the right dongle?
  - Internet connection switched off?
  - Desktop free of too personal items?
  - Screen saver switched off?
  - Enough battery or laptop plugged in?
- Is your presentation in the right format?
- Do all videos show properly?
- Does audio work?
- (if applicable) Does your laser pointer work?

⭐ Bonus tipps

- Prepare and test your equipment before the talk!
- Have your slides also as a PDF/offline version ready

#8 Behave Naturally

Keep **eye contact** with the audience; don't turn your back
→ But do not wonder what they might think of your presentation! (now it's too late)

Relax!

This also applies to answering questions:

- Listen to the whole question carefully; don't interrupt
- Repeat what you understood, especially for long/multiple questions.
- Think before you answer (!)
- Answers should be short and precise.
- If you don't know the answer, say so. This is okay.

⭐ **Bonus tipps**:

- Ask someone to take a video of you presenting and watch it
- Think about potential questions (and practice answering them)

#9 Learn from the mistakes of others

Have you ever been to a presentation where you were

🤦, 😕, 😵‍💫 or irritated by a specific behaviour of the presenter?

Then

- Analyze what went wrong
- (if possible) give them (friendly & constructive) feedback
- Do not make the same mistakes

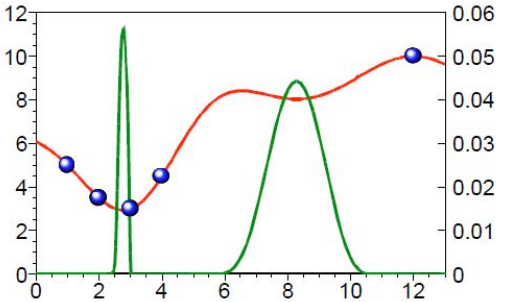
⭐ **Bonus tipp**

If you see a great presentation, learn from it (and let the presenter know that you enjoyed the presentation)

Good scientific practice

1. **Never present other people's work as your own**
   - Never copy-paste (even critical if it is your own work)
   - State explicitly what is your contribution

2. **Give appropriate credit**
   - references for figures
   - licence for photos/icons
   - Quotes: *X and Y [12] define this problem as follows : "…"*



Source: Jones et al [1998]

→ Never cheat or plagiarize on purpose, clearly mark your references, adopt best practices for avoiding mistakes

This Seminar: Feedback from Peers

After each presentation: Anonymous feedback survey. Not part of your grade. If you don't want feedback, let me know.

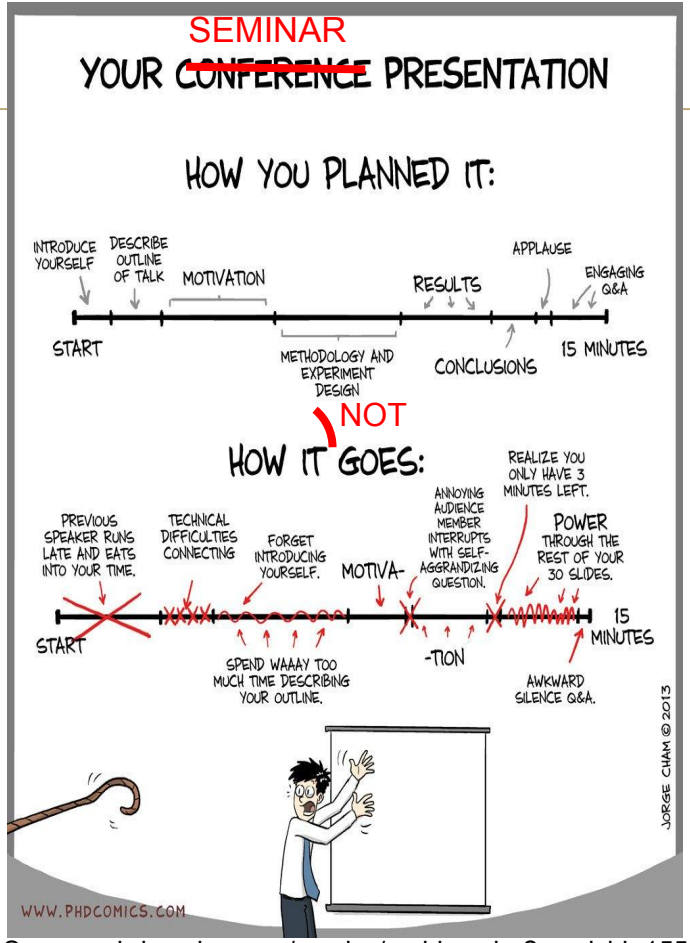
What?

- everyone can/should provide constructive (!) feedback to everyone
- feedback regarding content, slides and style

How?

- I will provide you with a link and ask you to add a QR code as your last slide
- I will give you access to the survey (or send you results)

Questions?



Source: phdcomics.com/comics/archive.php?comicid=1553

More resources

- **How to give a great scientific talk** https://www.nature.com/articles/d41586-018-07780-5
- **How to read a research paper** http://ccr.sigcomm.org/online/files/p83-keshavA.pdf
- **Free Images** Pexels, Unsplash, Better Images of AI