Thoughts About (good) Research

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What is Our Mission?

Do good research!

Find truth!

Be relevant!

Achieve impact!

The Cycle in Which we Live...

Research → Publications → Dissemination

People & Money

Achievements of research: a latent variable – not directly measurable ...

but what about indicators?!

Objectives and Achievements: Outline

1. Publication objectives
   - where and how to submit?
   - where not to submit?
   - how to measure success?
2. Dissemination objectives
3. People objectives
4. Money objectives

Part 1:
Publication Objectives

Peer review: general idea

Most scientists regarded the new streamlined peer review process as ‘quite an improvement.’
Peer review: general idea (2)

given: set of reviewers \( V = \{v_1, \ldots, v_k\} \), confidence grades \( r(v_i, d) \) for submission \( d \)

collective result (restrictivity by thresholds \( t_1 \) and \( t_2 \), tuning by weights \( w(v_i) \)):

\[
\text{decision}(d) = \begin{cases} 
  +1 & \text{if } \sum v_i r(v_i, d) - w(v_i) > t_1 \\
  -1 & \text{if } \sum v_i r(v_i, d) - w(v_i) < t_2 \\
  0 & \text{otherwise}
\end{cases}
\]

Special cases:
- "Unanimous Decision"
- "Voting"
- Weighted Average (e.g., weighted by some quality estimator)

Peer review: a simple model

Given: set of reviewers \( V = \{v_1, \ldots, v_k\} \), binary decision (accept/reject)

Wanted: Approximations for loss and error for "unanimous decision"

\[
X_i = \begin{cases} 
  1 & \text{if } v_i \text{ assigns paper correctly} \\
  -1 & \text{otherwise}
\end{cases}
\]

Probability of correct collaborative decision:

\[
P(X_1 = 1, X_2 = 1) = P(X_1 = 1) \cdot P(X_2 = 1) + \cos(X_1, X_2)\]

\[
P(X_1 = 1, \ldots, X_k = 1) = \prod_{i=1}^{k} P(X_i = 1) \cdot P(X_1 = 1, \ldots, X_k = 1) + \cos(X_1, \ldots, X_k)\]

- analogously we obtain \( P(X_1 = 0, \ldots, X_k = 0) \).

\[
\text{junkred} = 1 - P(X_1 = \ldots = X_k = 1)\]

\[
\text{loss} = 1 - P(X_1 = \ldots = X_k = 0)\]

\[
\text{error} = 1 - \text{uncorrected}\]

Peer reviewing is not perfect!

Progress changes rules and ways of thinking!

Famous rejected papers:
- B-trees
- The first paper about the Web (Berners-Lee et al)
- The first paper (Hendler et al) and the second paper (Fensel et al) about Semantic Web

Where to submit?

Events with
- peer review
- high visibility and impact in the community
- high restrictivity (low acceptance rate, 5-15 %)
- good organizers and reviewers

Sources of recommendations
- your supervisor and colleagues
- Microsoft Libra
- Australian Ranking of ICT Conferences
Differences in publication culture

- Computer Science
  - Peer-reviewed conferences
  - Top conferences have 5-15% acceptance rate
  - Often value conferences > journals

- Pure Sciences (e.g., Math, Physics)
  - Preprint at ArXiv.org
  - Rigorous reviews for journals
  - Huge flagship conference (ICM 98 attracted ~4000)

- Social Sciences
  - Often value journals > conferences
  - Conferences are mostly for gathering or short abstract
  - Based screening
  - Rigorous reviews for journals

Where not to submit?

- Known conferences and journals of (very) dubious reputation
- Nagib-Callaos-Conferences, Khalid-Soliman-Conferences
- Blacklists are impossible to keep up (threats by organizers, e.g. fakeconferences.org)

Indicators: curious OC and PC, fake venues, missing or questionable reviewing process, paper presentation not required.

see also:
- SIGen - An Automatic CS Paper Generator

Publications: success indicators

- Visibility: we publish on high-quality conferences (A+, A, B)
  - Check DBLP profile against CORE

- Impact: our work is frequently cited by others
  - Check Google scholar, Citeseer, ...
  - Evaluate with Publish or Perish

- Reproducibility: method details, tuning parameters, evaluation datasets, libraries, etc. are documented and available to public

- Reliability: our models are correct, evaluation is consistent

Visibility: check the DBLP Profile!

Citation metrics: example

- h-Index: $N_h$ papers have at least $h$ citations each, and the other ($N_h$-h) papers have no more than $h$ citations each.


- g-Index: the (unique) largest number such that the top $g$ articles received (together) at least $g^2$ citations (gives more weight to highly cited articles)

Reproducibility

For better transparency and reproducibility:

- Provide software (evaluation methods and libraries used) to public
- Make also evaluation datasets available (e.g. online)
- Contribute to challenges and evaluation initiatives (e.g. TREC, CLEF, Semantic Web Challenge, Billion Triple Challenge etc.)
- Provide advanced versions of your contributions with full proofs, explanations, and complete experiments (technical reports, journal papers, online material)

Reliability

Try to avoid tricks and hacks (if possible.. you know..)
Adopt established evaluation methods and best practices of the target community

- systematic experiments with large-scale reference data sets are very welcome in many communities
- example: UCI Machine Learning Repository

Statistical significance is often important..
Ensure testbed transparency and reproducibility (as discussed before)
Clearly identify the novelty, originality, and expected benefits of your work wrt existing stuff! Seven out of ten PhD status applications fail at this point

Dissemination Objectives

Ensure visibility of you and your work!

Be present at relevant events
(... ideally with accepted contributions :-)
Consider to submit an advanced journal version after conference acceptance
Make interesting software prototypes available to public and keep them up to date
- successful examples: SVM light, Snowball, Mallet...
Contribute to evaluation initiatives and challenges

People objectives / Networking

Organisation of workshops
- what are the key ones?
-- New themes!
- Reviewing
-- Reviewers are also cited!
- Summer schools
  - learning
  - teaching

Supervision of students
(lectures, projects, diploma thesis) is also important

Communities
- Thematically focused
  - E.g. EKAW, BTW..
- National Communities
- Gil focused groups
- Evaluation activities
- Standardization activities
- EU / DFG projects
- Special interest groups
- Open source prototypes and libraries, public datasets, etc.
Presentation Skills
and
Scientific Writing

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Scientific writing: major points

Important points:

Subject
Purpose

- to exchange the scientific knowledge
- to ask and answer specific questions

Audience

- scientists and those interested in the subject
- a publisher or an editor

Paper Organization

The principle of the diamond

1. Introduction
2. Related Work
3. Your Message
   - Methods
   - Evaluation: methodology, results
   - Discussion
4. Conclusion and Future Work
5. References

The other side: reviewing

Be always polite, provide constructive criticism and positive recommendations!

Key aspects:

- Novelty / originality, step beyond state of the art
- Technical quality and depth
- Relevance / appropriateness for target audience

The other side: reviewing

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Possible recommendations

- Accept the contribution, possibly with minor changes
- Major revision, reject and resubmit later
- Reject, do not submit further, think first what you are doing
- Submit to other conference (which ones)
- Submit as a workshop paper (which workshop)
- Submit as short paper or poster

Overall recommendation should be aligned with discussion and scores you give to the contribution.
Presentation skills: before we start:

What is a successful presentation for you?
When have you seen a really good presentation?
Why do you think that presentation was good?
Can you establish other criteria from presentations you have seen?

Getting started

You want to present your work to an audience in X
Define your audience
- expert; non-expert; mixed
Define your time
- fixed time limit: seems long, but usually too short
Define your environment
- accommodate - in a strange room - to the equipment (beamer, microphone, board)
- have back-ups (power supply, memory stick, CD, handouts, board, ...)
Define your design
- logo, name of the institute, colour, layout, structure, ...

Nervous at presenting (1)

Accept that you are probably going to be nervous
Find your own solution(s):
- Something to drink
- Deep breathing
- Go for a walk
  ⇫ fresh air
- ...
The only effective remedy: Accept it. Have strategies!

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The major fault with many presentations is:

The structure of the material doesn’t harmonize with the visual aids or the way you deliver it.

Common mistakes:
- Unstructured facts
- No obvious framework
- The audience becomes disoriented

Structure (1)

Be very selective. You can’t include everything. Structure material as a diamond of detail:

1. Title slide
   - Brief summary: place your work in context, give the big picture; why don’t put results in here? Tell them what you are going to do

2. Introductory overview slide
   - Good summary of methods, results and conclusion

3. Place work in context
   - Tell them what you are going to do

4. The detail
   - Then/here give detail; tell them

5. Concluding overview slide
   - What your work means: Your conclusions and further directions. Tell them what you’ve told them

Structure (2)

Structure (3)

Slides for the basic structure

Title slide
Overview slide
Detail
Conclusion slide

Presenting: Pausing and Interruptions

If you lose your place or have to pause, say nothing:
- Control your body language, find your place again
- Interruption beyond your control, say “I’ll repeat that…” or continue without hesitation

A pause for the speaker seems longer than for the audience

Pause because of thinking: look at someone in audience; not at ceiling or floor

Interruption = question(s)

Presenting: Finishing the Presentation

Be professional:
- Control your body language, find your place again
- Interruption beyond your control, say “I’ll repeat that…” or continue without hesitation

A pause for the speaker seems longer than for the audience

Pause because of thinking: look at someone in audience; not at ceiling or floor

Interruption = question(s)
Presenting: Finishing in a hurry (1)

- Don’t fluster
- Smoothly finish the sentence you are saying
- Say something like “I’m sorry I don’t have time to give you the details here. But I’d be pleased to talk to anybody afterwards.”
- Put up your conclusion slide
- Say “And so, in conclusion, ...”
- If time is very short, put up Conclusions slide for audience to read

The other side

The other side: to be the chairman (1)
The chairman is in charge of controls
- objectiveness
- efficiency
- time
  - of speaker
  - of whole event

The other side: to be the chair(wo)man (2)
It is the job of the chairman:
- To stand in front at the beginning and at the questions’ session. Be competent/confident (no hands in pockets)
- To introduce the speaker, the topic/titile (+ where s/he works, etc.)
- That the talk and questions session go smoothly
  - To ask questions him/herself (important if there are no questions)
  - To admit to the floor (one questions after the other)
- To clarify incomprehensible (even inaudible) questions
- To summarize (if necessary)
- To conclude the talk and thank the speaker and audience/continue with next speaker

The other side: ask questions
Always ask questions and give comments:
- To clarify what you did not understand
- To recommend something
- To add new/unknown/important material
- To give another viewpoint
- ...

If you don’t have questions at all, ask anyway about:
- Why is this work/research important
- How about costs/real time/etc.
- Future work/direction (if not stated before)
- ...

The other side: feedback (1)

Feedback is important
- because it is like the applause for the actor on stage
- because you learn from your own mistakes
- always give feedback
- (unfortunately: no feedback culture)

‘Who plays up to me is my enemy, who blames me is my teacher.’
The other side: feedback (2)

**How to give feedback:**

Start with the positive / good things (on the talk, etc.)
Move on to the things the presenter could have done better
- Don't say: This and that was very bad / idiotic / stupid
- But: You could improve here...; it wasn't too bad, but you could do better if...

Put your criticism in a positive way! Always praise, but make (necessary) improvements clear!