Being Precise

Roman Kern <rkern@tugraz.at>

706.015 - Introduction to Scientific Working

Being Precise in Science

Checklist for Publications & Scientific Work

Consistency & Detail

- Be consistent
  - e.g., heading, entities, naming, no synonyms, ...
- Level of detail
  - Do not omit critical assumptions
  - In the draft include (maybe too much) information
    - Have another reader gauge the level of required information

Wording

- Probabilities vs. likelihood

    - https://en.wikipedia.org/wiki/Notation_in_probability_and_statistics

- Measure vs. metric

- Correlation

    - Specify, which correlation is meant
        - Check (e.g, with others), if the method of appropriate

- Averages

    - Which?

    - average → mean → arithmetic|geometric|… mean

Wording

- Similarity
  - Applying a similarity measure does not measure similarity in the domain (latter one if often impossible to measure)
    - e.g., a cosine similarity does not measure semantic similarity
    - If one makes this statement, references are needed to back this up!

Language

- Use the language of the community (jargon)

    - Do not force terminology from other domains
    - e.g. robust
        - Used differently in different communities, e.g., computer science vs. statistics
    - Look at other publications from the same journal, conference (follow the terminology)

- Good English $\rightarrow$ have others read your manuscript

- Therefore vs. thus

- Avoid super-long sentences

    - Maybe use one sentence $\rightarrow$ one line in Latex

- Method vs. approach vs. algorithm

Notation

- Norm (specific, which one)

- Statistical significant vs. significant

- Introduce all variables (of a formula near to this formula)

- Parenthesis for reference to formulas, e.g., Formula (11)

Presentation

- Provide as much details as possible (e.g., error bars)

- Use units for measurements

- Use numbers if available (also in the abstract, also for non-main results)

    - Maybe use a systems section

- Clear citations and references

Work

- Statistical hypothesis testing
  - Check preconditions & assumptions
  - Apply the correct test (t-test, one-sided vs. two sided, …)
    - Ask others, if unsure

Roman Kern <rkern@tugraz.at>, Institute of Interactive Systems and Data Science, Graz University of Technology
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What is a Scientific Argument

- Scientific **claim**
  - e.g., Deep learning requires large datasets
  - e.g., Deep learning methods are black-boxes
- In what part of a paper one would expect such claims?
- How can we systematically collect scientific claims?

Thank You

For your attention!