Content Analysis of Conclusions of Empirical Studies in Software Engineering

Bachelors Thesis – Closing Presentation
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Goals

• Evaluate the quality of empirical studies in SE
• Are the conclusions „good“?
  • Do they contain appropriate generalization?
• Provide valuable insights for future lectures/tutorials on
  • Structure of the tutorials
  • Code system used for the Content Analysis
• Analysis of gathered data
  • What makes a sentence easy or hard to code?
Related Work

• Fair amount of studies about the quality of empirical studies in SE
• Focus on strengths/weaknesses, providing hints and roadmaps
• Most evaluations agree: quality is not good enough

• Zannier et al. (2007). “On the success of empirical studies in the international conference on software engineering”
Content analysis – a quick overview

• Take or create a coding system
  • i.e. by open coding
• Search for all occurrences of each code in your material
• Count those occurrences
• This process should be conducted at least twice, by independent reviewers
• Calculate Inter-reviewer agreement
Lecture/Tutorial

- Develop a unified code system
- Code the conclusion + relevant parts of empirical papers from ICSE 2021
- Data validation, clustering and code correlation
Data quality

• Agreement between different reviewers limited (about 30%)

=> Makes it hard to make strong statements about anything
=> Can we improve data quality and salvage the data somehow?
Data quality improvements

- Only consider conclusion
- Merge some codes with low agreement that fit together
- Improve data validation/cleansing

=> Even after several improvements, agreement is still below 50%
Reasons for poor data quality

• High workload
• A significant amount of human error
  • Failure to abide by some coding-rules
• Disagreement on code usage
  • Generalization vs. Repeat research process
  • Generalization vs. Further work
• Coding is hard!
• High agreement is most often reached when certain keywords are present
Conclusion

• Provide more time for the students
• Reduce the number of studies used
  • Reduces stress, improves quality of the data collected
• Improve the conciseness of the code system
• Have a stricter guide to coding
  • If a code is used, certain other code sub-trees must be covered as well
Thanks for your attention!

- Any questions?