Requirements Analysis for Human Behaviour Models for Activity Recognition

Presentation

Kristina Yordanova

Chair of Mobile Multimedia Information Systems
Department of Computer Science
University of Rostock
Germany

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Introduction and Goal

cooking task

3-person meeting

office scenario

Introduction and Goal

A requirements analysis study was conducted in order to identify:

- whether the derived set of requirements for human behaviour models is complete
- not well defined requirements
- how people outside the field of activity recognition understand the requirements
- how to improve the requirements specification
- how to create such kind of questionnaires

The Study

- previously 19 requirements were identified by analysing the 3 problems from ADL
- for each requirement the study participants were asked to decide if the requirement is:
  - verifiable
  - valid
  - clear
  - complete
  - consistent
  - feasible
  - testable
  - traceable
  - important

The Study

each of the properties was represented by a multiple choice question from 1 to 5, with 5 being the strongest answer

Is the requirement complete? Is there some missing information in the requirement's specification?

☐ nothing missing ☐ almost nothing ☐ some ☐ most missing ☐ everything missing

How important is this requirement for solving the three modelling problems?

☐ very important ☐ important ☐ not important ☐ optional ☐ irrelevant

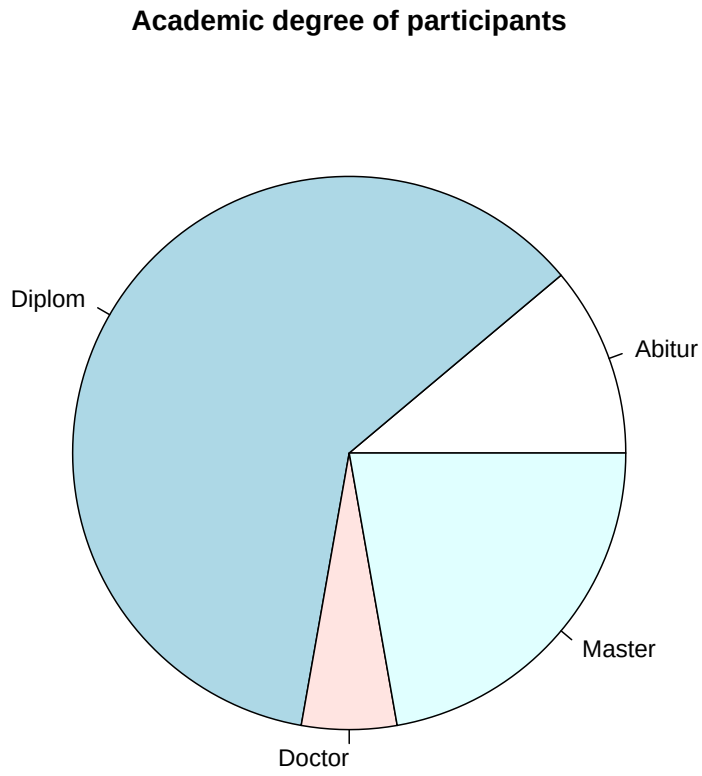
The Study

- for each requirement, the participant was asked to give a concrete example from one of the problem domains
- the participant was also asked to give suggestions for the requirement specification's improvement, if relevant

- **Hypothesis:** *The requirements that are not well defined will have a lower score.*

The Participants

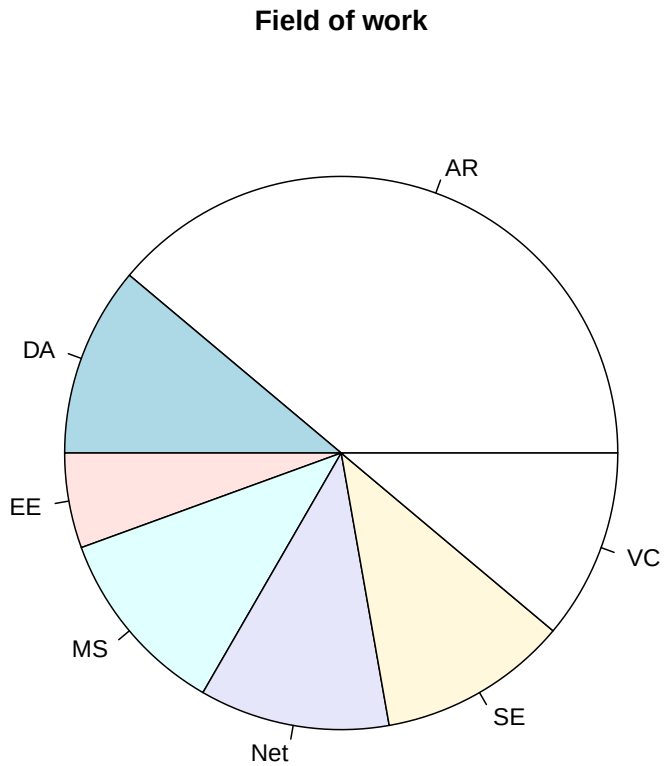
- 18 participants
- with different education degrees
  - 2 Abitur
  - 11 Diplom
  - 4 Master
  - 1 Doctor



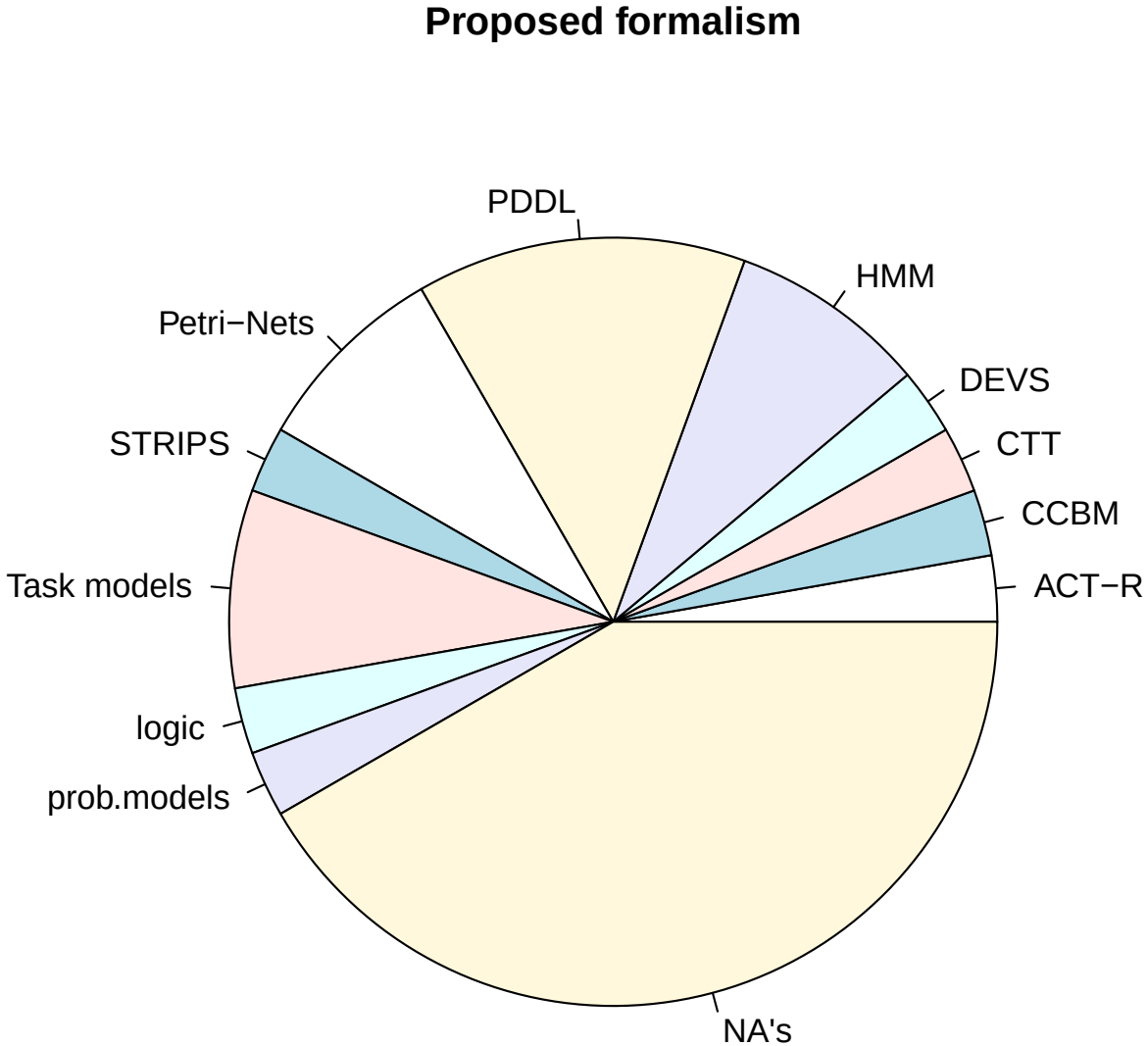
The Participants

From different fields of computer science

- 7 AR = activity recognition
- 2 DA = data analysis
- 1 EE = electrical engineering
- 2 MS = modelling & simulation
- 2 Net = networking
- 2 SE = software engineering
- 2 VC = visual computing



Proposed Solution Formalisms



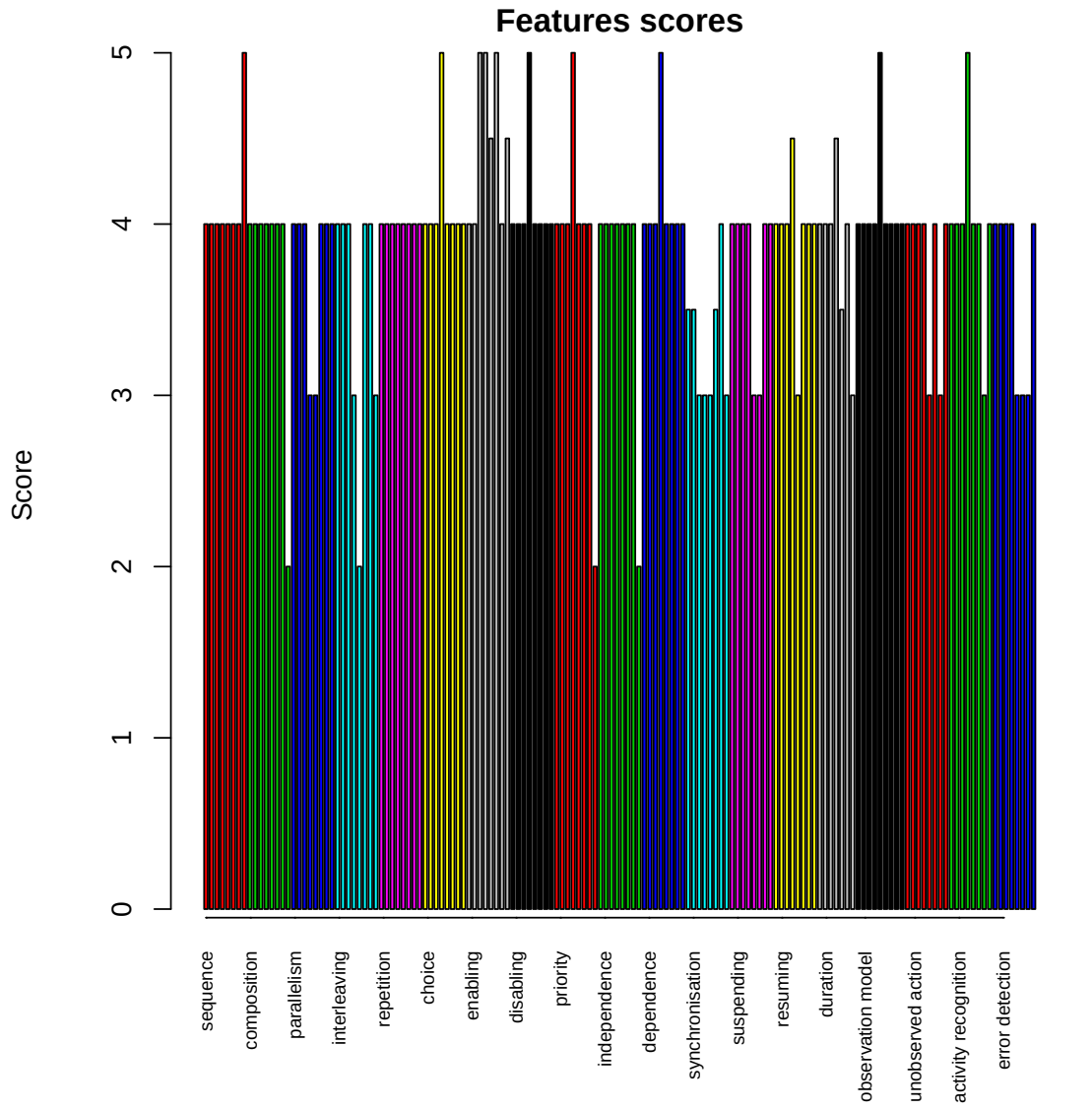
Features scores

Hypothesis:

The participants will stick to the middle ground with their answers (average score of 3).

Result:

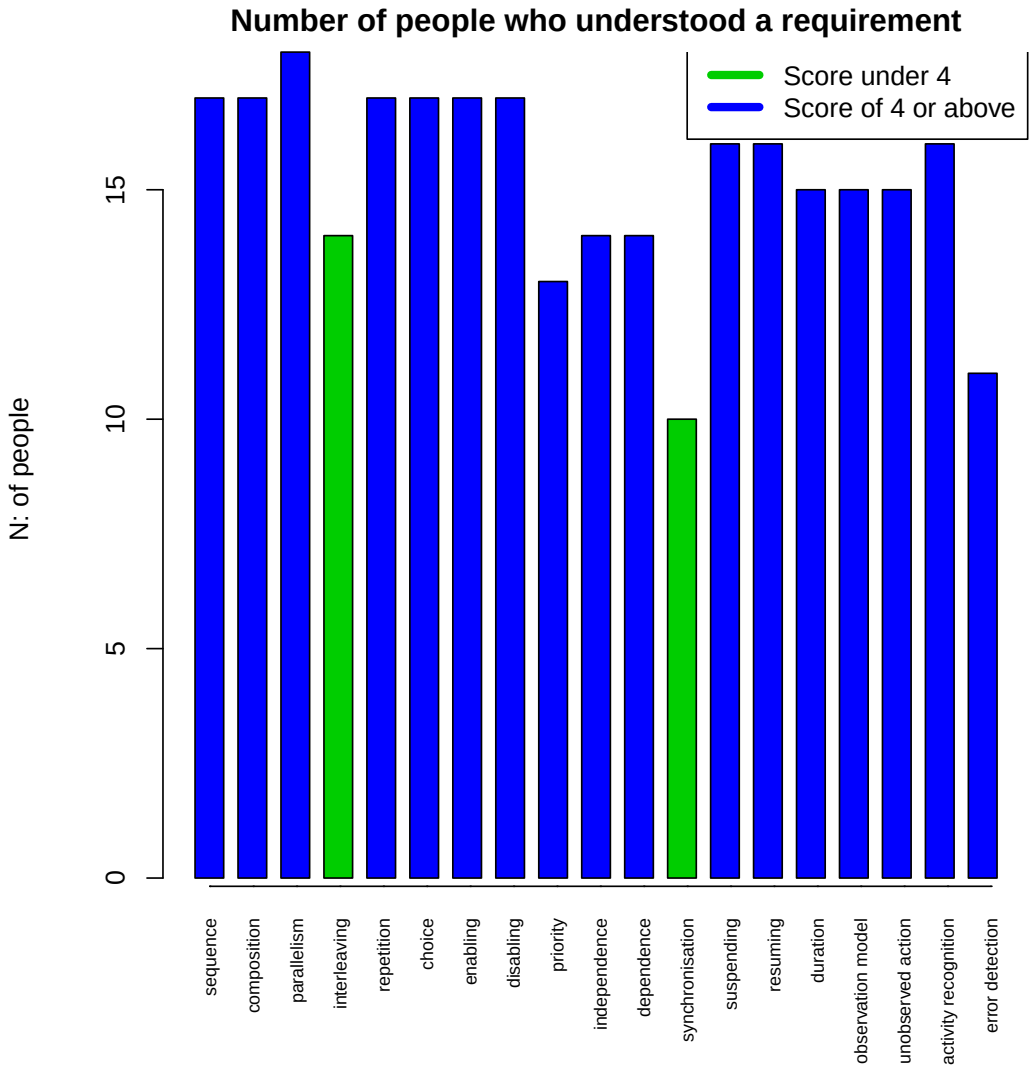
- mean of 3.89
- median of 4



Understanding the requirements

Hypothesis:

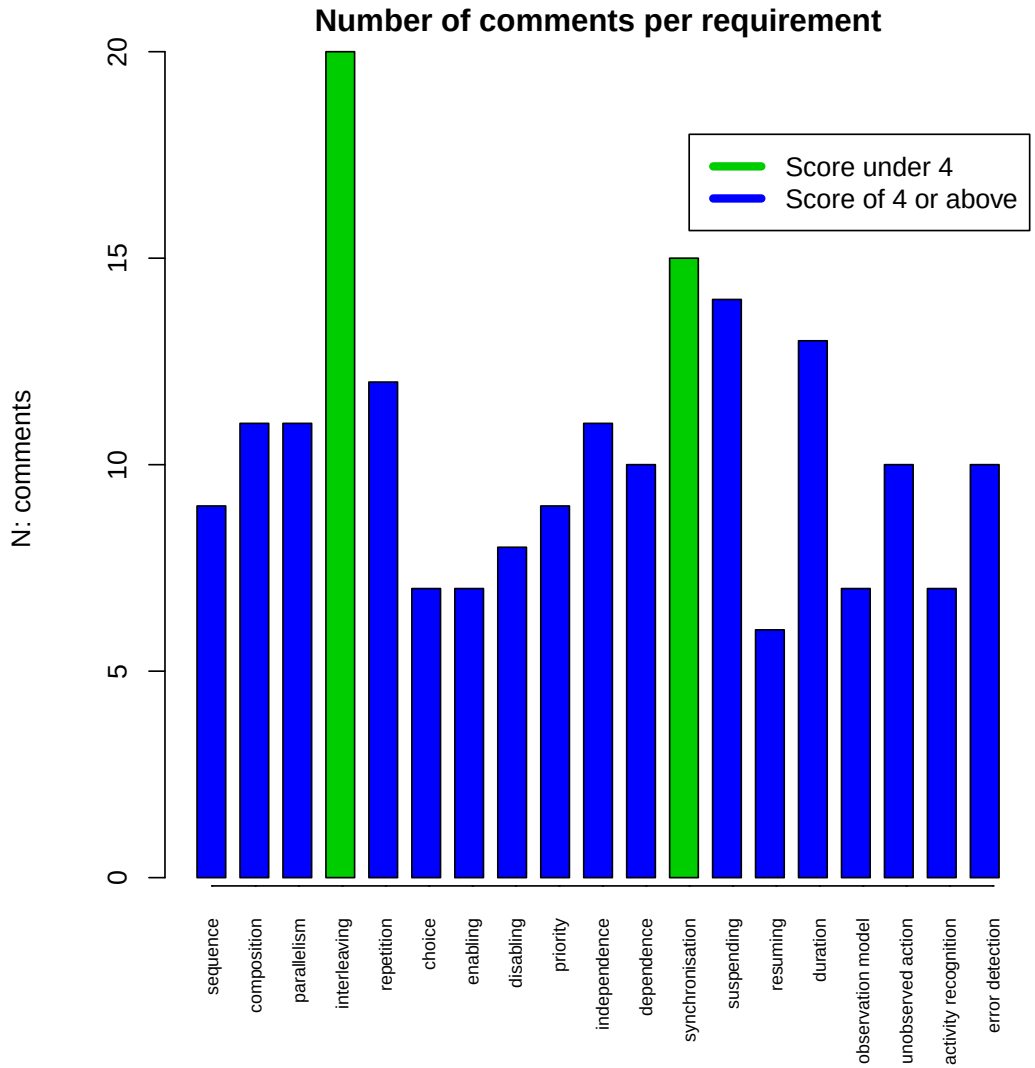
The more people understood a requirement specification, the higher the specification score.



Comments on the requirements

Hypothesis:

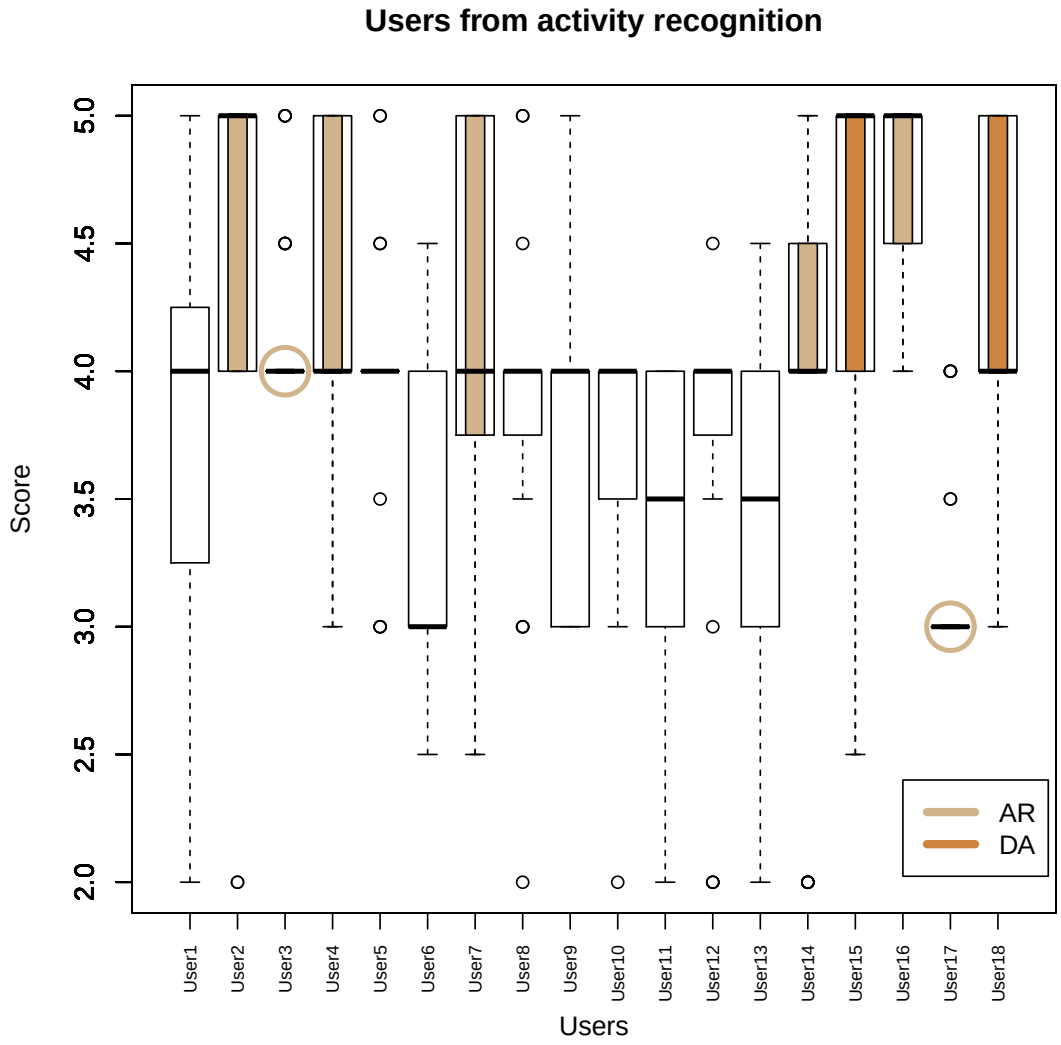
The more comments per requirement specification, the lower the specification score.



Dependence on the field of work

Hypothesis:

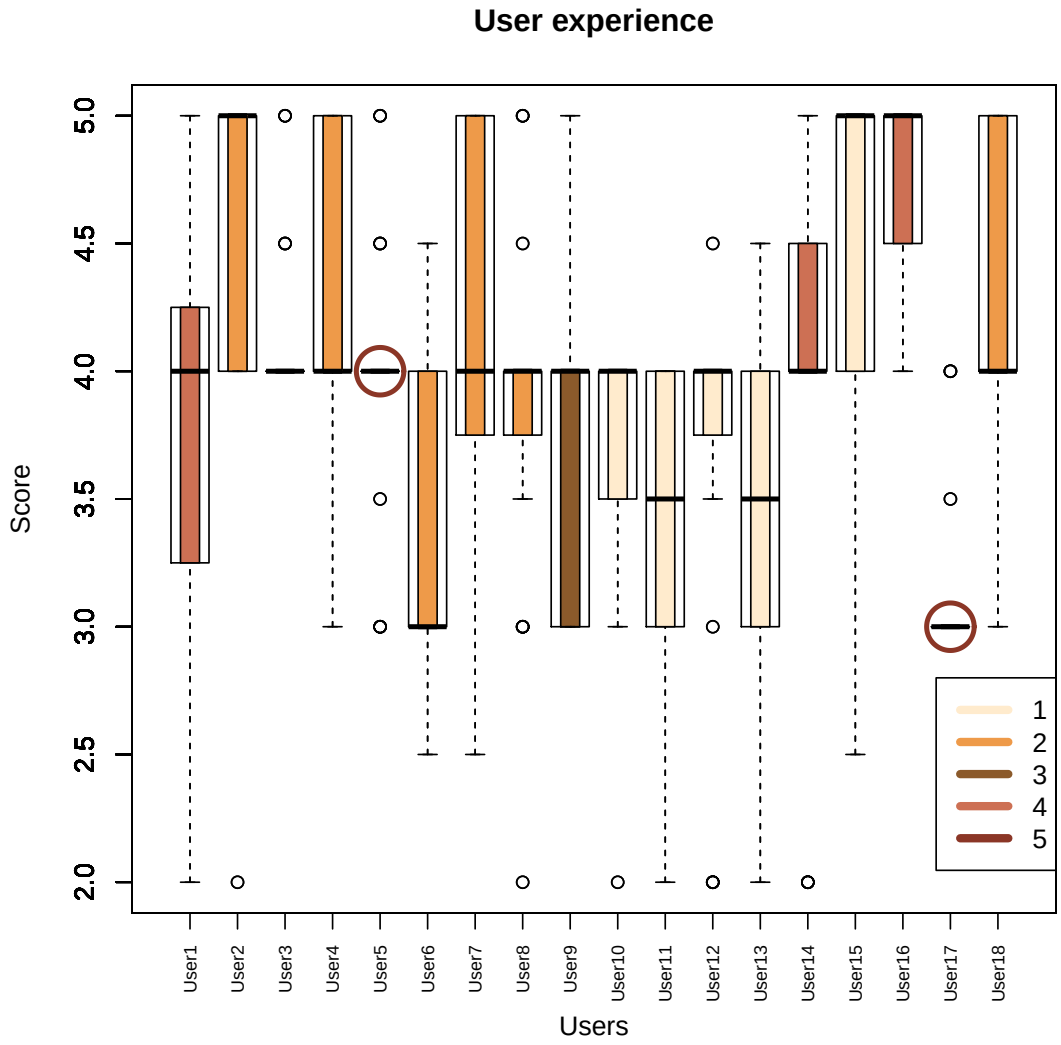
The participants from the field of activity recognition gave higher scores for the requirements' specifications.



Dependence on the experience

Hypothesis:

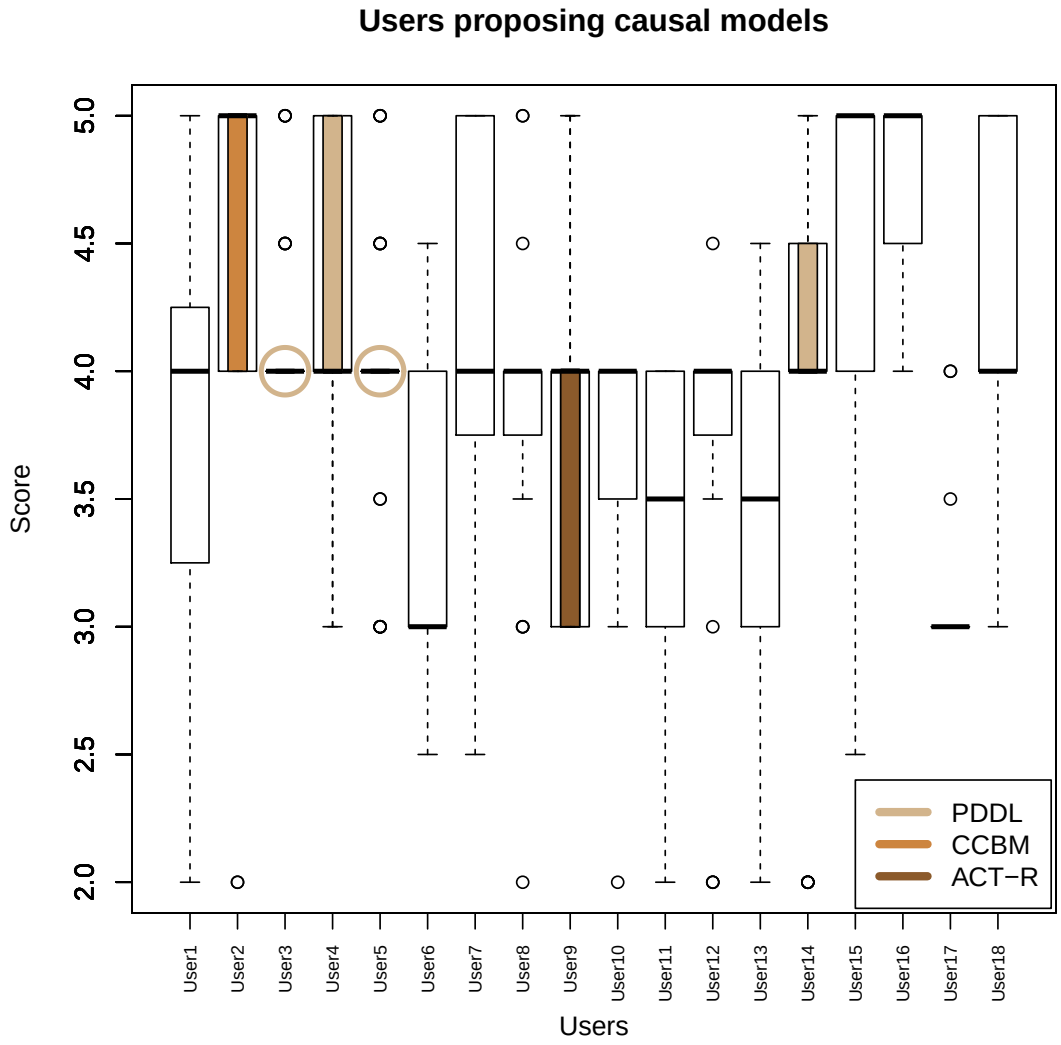
The participants with more experience gave higher scores for the requirements' specifications.



Dependence on the formalism

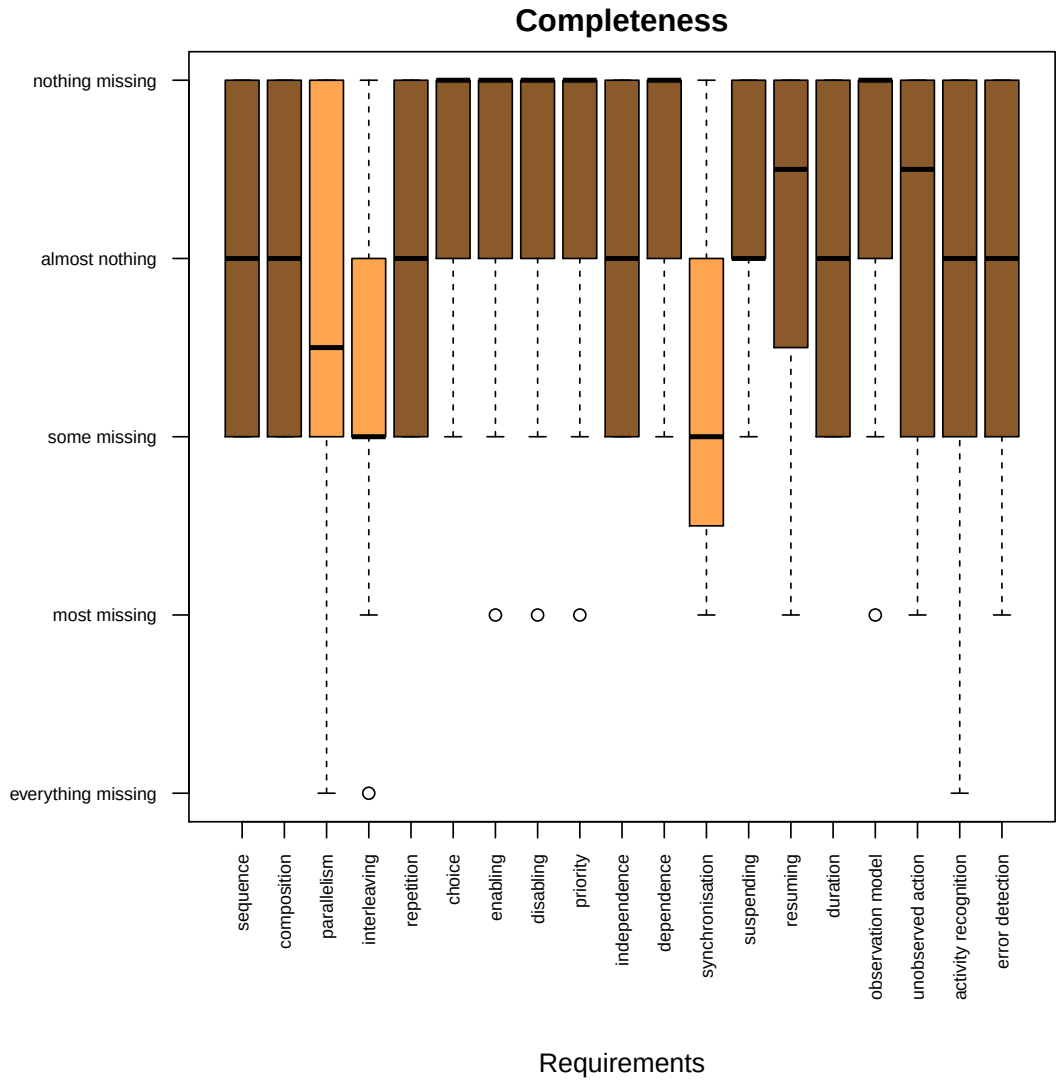
Hypothesis:

The participants proposing causal models gave higher scores for the requirements' specifications.



Completeness of the requirements

Shows which requirements have missing information in their specification.



Frequent comments

222 comments; average of 10,57 comments per requirement

- the requirements have different importance depending on the use case
- some requirements are specified with the same word as the name of the requirement
- the difference between some requirements is not clear
- some requirements can be merged together
- too many requirements
- the notion of time is not defined

Problems

- how to deal with outliners? (user 17)
- how to evaluate the data
  - ordinal vs. quantitative data
  - is the data equidistant?
  - can we do arithmetics with the data?

Discussion

Thank you for your attention!

Kristina Yordanova
kristina.yordanova@uni-rostock.de

Chair of Mobile Multimedia Information Systems
Department of Computer Science
University of Rostock
http://mmis.informatik.uni-rostock.de

DFG Graduate School MuSAMA
www.musama.de