Discovering Aspects in Requirements with Repertory Grid

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Outline

⇒ Introduction
  ⇐ Early aspects
  ⇐ Repertory grid technique

⇒ Example
  ⇐ Goal-oriented
  ⇐ Viewpoint-based

⇒ Related work

⇒ Concluding remarks
Aspects in Requirements

- dominant decomposition
  - NL, UC, VP, goal, SRS, etc.

- aspectual req.s
  - broadly scoped CCCs
  - impacts on other req.s or concerns

- from early aspects to late req.s
Assumptions

⇒ Assume

⇒ there exists a relatively well-organized set of req.s derived from some dominant decomposition criterion

⇒ Aim

⇒ develop a systematic & effective method to support analysts for viewing & manipulating req.s models to expose how entities relate to one another, thereby facilitating aspectual req.s identification & conflicts detection
Repertory Grid Technique (RGT)

George Kelly (1955), psychotherapy

- verbalize how people construe certain factors within the area of interest
  - verbalizations: constructs (bipolar in nature)
  - factors: elements

- triad: two elements to be seen as similar and thereby as different from a third
RGT Example

- Information sources
  - TV, Newspaper, Radio, NewsGroup, Web, etc.

- Elements in RGT

- Triad: (A) TV (B) Newspaper (C) NewsGroup
  - Construct: many focuses (A, B) vs. single focus (C)
  - As a rating scale (1-5), and each element is assigned a rating on that construct
Sample Repertory Grid

Many focuses
Multimedia
Entertaining
Two-way
Any time
1 2 3 4 5 6

1 2 2 5 3 1
1 2 4 5 4 1
1 1 3 3 2 2
5 5 4 3 1 1
4 5 1 3 1 1

1 2 3 4 5 6

Web
E-mail
NewsGroup
Newspaper
Radio
TV

1 Single focus
2 Text
3 Not entertaining
4 One-way
5 Fixed time
Cluster Analysis

Multimedia

Many focuses

Entertaining

One-way

Fixed time

2 Text
1 Single focus
3 Not entertaining
4 Two-way
5 Any time

4 NewsGroup
3 Newspaper
5 E-mail
6 Web
1 TV
2 Radio
Goal Model

Legend:
- Softgoal
- Task
- Contribution Link
- Dependee
- Depender
- Dependency

1 - break
2 - hurt
3 - neutral
4 - help
5 - make
Cluster Analysis

Break Usability
1. Make Usability
2. Make Responsiveness
3. Make Integrity
4. Make Security
5. Make Confidentiality
6. Make Privacy

Break Responsiveness

Break Integrity

Break Security

Break Confidentiality

Break Privacy

1. PageLayout[GUI]
2. Infobox[font]
3. Customize[language]
4. Search[shop]
5. Prepare[cart, product]
6. Report[shop]
7. Manage[shop]
8. Search[shop]
9. Navigate[shop]
10. Manage[account]
11. CheckOut[cart, product]
12. PasswordProtection[account]
Dichotomized Repertory Grid
Aspects in Goal Model
# Viewpoint-Based Models

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Terminology</th>
<th>Consensus</th>
<th>Correspondence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same</td>
<td>Same</td>
<td>Stakeholders use terminology and concepts in the same way</td>
<td>Stakeholders use different terminology for the same concepts</td>
</tr>
<tr>
<td>Different</td>
<td>Different</td>
<td>Stakeholders use same terminology for different concepts</td>
<td>Stakeholders differ in terminology and concepts</td>
</tr>
</tbody>
</table>
Cluster Analysis
Related Work

- Baniassad et al [IEEE SW’06]
  - aspect terms + impact req.s + scattered concerns

- NLP-based (Mining EAs)
  - corpus vs. well-organized req.s models
  - meaning: relationship between signs and actions

- Goal-oriented [Yu’04]
  - handle multiple viewpoints and conflicting concerns
  - more sensible and enlightening
Concluding Remarks

⇒ Summary: RGT as an EA identification method
  ⇩ NOT using triad
  ⇩ Examples of goal- & viewpoint-based req.s
  ⇩ Conceptual resolution throughout the lifecycle

⇒ Future work
  ⇩ Comparison study (benchmark; accuracy, coverage, etc.)
  ⇩ Conflicts resolution and req.s prioritization
  ⇩ Aspects evolution
Final Words on RGT

All in all, the repertory grid is truly a technique: A grid of itself is nothing more than a matrix of blank cells.

It is only limited by the users’ imagination.
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