Requirements engineering in the precontract phase

Calculating Software Projects on a Mock-Up based approach

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Agenda

• Motivation
• Mock-Up Generation
• Cost estimation
• The modeling by example approach
• Mobex
• Conclusion
Motivation

- **Characteristics in the precontract phase:**
  - Precontract phase is unpaid
  - Bidders are competing with other suppliers

- **Challenges in the precontract phase:**
  - For an evaluation of the requirements Mock-Ups which visualise them must be created
  - Based on the evaluation requirements a practical cost estimation has to be realised

- Problem: The Mock-Ups can only be used for requirements evaluation and presentation. Hence, they will discard. The cost estimation will be generated in a separate way. ➔ spend much time and money

  ➔ **We want Mock-Ups to be more efficient**
Mockup Generation

- HTML Editors and graphic applications
  → very time intensive

- Prototyping tools
  → focus on the presentation layer
Mockup Generation

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No support for cost estimation and other aspects!
Cost estimation in software projects

Estimation methods

Empirical methods
- minimal effort
- requires previous projects for a useful estimation

Algorithmic methods
- accurate
- requires formular, parameter, quantity structure of costs
Modeling by Example (MbE) approach

- **Motivation:**
  - Mock-Up provides cost estimation and generation of project documents!

- **Core aspects MbE approach:**
  - Easy visualizations of requirements without technical skills
  - Requirements reutilization
    - Template Concept
    - Group coherent requirements in modules
  - Semantic Enrichment
    - Cost estimation
    - Semiautomatic generation of project documents ex. offer

- **Implementation of the approach → Mobex**
Mobex : Elements

Shapes

Form elements

Multimedia
Mobex: Module

Module „contact form“

contact form

success

failure

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Mobex: Template Concept
Mobex: Template Concept
Semantic Enrichment

MbE Modul

Visual Aspect
- Mock-Ups
- Presentation
- Videos

Calculative Aspect
- Efforts
- Licences
- Time Duration

Technical Aspect
- Technologies
- Best Practices
- Test Cases

Professional Aspect
- Specifications
- Descriptions
- Arguments
Expense example:
One (TU) hour (TD) Customizing (CT) costs 80 € (CR) and the customizing of a captcha module in a contact form takes two hours (V), so cost of 160 € arise.
Elements and expenses
Elements and expenses

Element properties add n expenses
Calculation Schema

Modules and elements represent the quantity structure of costs

each Element(e): 1-n expense(s)
each Modul(m): 1 risk markup

\[
\text{TotalCosts} = \sum_{m=1}^{n} \left[ \sum_{e=1}^{n} [TU_{me} \cdot TD_{me} \cdot CR_{me} \cdot V_{me}] \cdot RP_{m} \right]
\]
Semiautomatic document generation

Mock-Up → Semantic Enrichment

Use cases
Specification
Calculation
...

Func. specification
Offer
Presentation
Configuration
...

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Conclusion

- MbE simplifies the process of cost estimation
- Each modeled element will be part of the quantity structure
- Individual cost rates can be specified for maximum flexibility
- The MbE tool provides a calculation in the background by creating the mockup
Thank you for your attention