REFSQ 18
Poster Slam!

1 minute each ☺

1. Tool Support for Value Modeling and Risk Analysis of e-Services

2. The Interactive Narrator Tool: Effective Requirements Exploration and Discussion through Visualization

3. Multiple Criteria Decision Support in Requirements Negotiation

4. Elicitation of SME Requirements for Cybersecurity Solutions by Studying Adherence to Recommendations

5. ORSIM: Integrating existing software components to detect similar natural language requirements

6. Managing Multi-Lingual User Feedback: the SUPERSEDE project experience

7. Defect Detection and Machine Learning for Requirement Engineering: new Roadmaps

8. Back to Basics: Extracting Software Requirements with a Syntactic Approach

9. PACAS: A Gamified Platform for Participatory Change Management in Air Traffic Management Systems

Tool Support for Value Modeling and Risk Analysis of e-Services

Roel Wieringa, Jaap Gordijn, Dan Ionita
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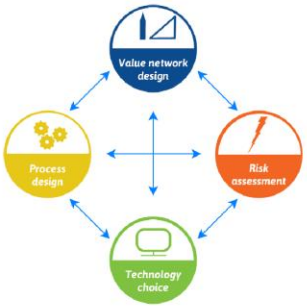
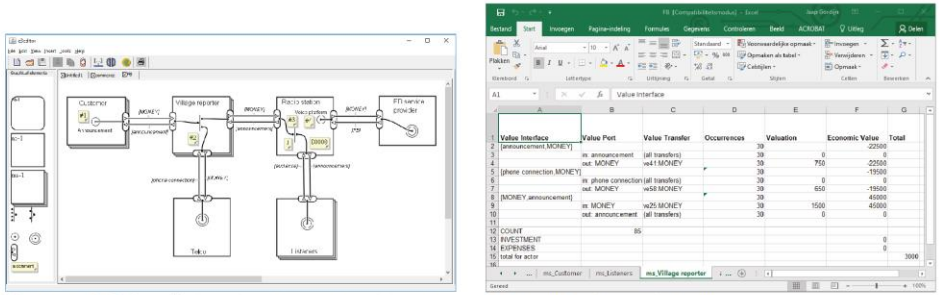
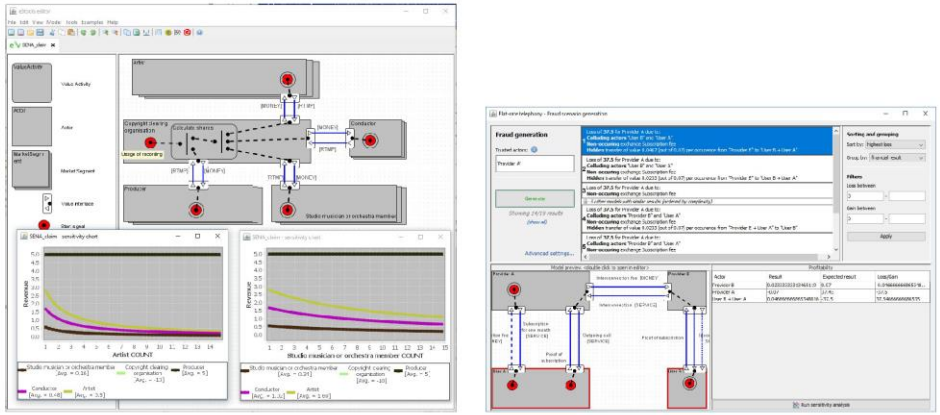


Value engineering iterates over four activities.

- **Value network design**
  - Make a map your business network and explore what new services or products you could deliver with new technology, and what this would mean for your relation with partners in your network
  - Quantify the value of services and products delivered, make assumptions about frequency of transactions, and estimate required investments.
- **Technology choice**
  - Choose technology to perform the commercial transactions in the value model. Update the value model with the commercial possibilities of the new technology.
- **Risk assessment**
  - Simulate different scenarios to compute profitability and assess sensitivity to your market assumptions. Revise the value model if necessary.
  - Automatically generate vulnerabilities to fraud, and rank them on severity. Revise the value model if necessary.
- **Process design**
  - Once you are satisfied with your peer-to-peer business model, map this to your business processes. Re-evaluate risk and profitability.



Value network design: e^3value model of community radio journalism in rural Mali, with profitability sheet.



Risk assessment: Screenshot of a sensitivity analysis for market assumptions in a rights clearance model (left) and a fraud risk assessment generated for a flat-rate telecommunication subscription model (right)

The Interactive Narrator tool

Effective Requirements Exploration and Discussion through Visualization

Slob, Dalpiaz, Lucassen & Brinkkemper

Universiteit Utrecht

The Interactive Narrator Tool

Effective Requirements Exploration and Discussion through Visualization

Govert-Jan Slob, Fabiano Dalpiaz, Sjaak Brinkkemper, and Garm Lucassen
Utrecht University

Context and Motivation

Natural language is the predominant notation for software requirements [1,2]. In agile software development, requirements are often expressed as **user stories**:

As a (role), I want (goal), so that (benefit)

As a Visitor, I want to choose an event, so that I can buy tickets for that event.

Problem:

It is hard to make accurate mental models of the system under development from a large quantity of user stories. This hinders the understanding of the system.

Background and Goal

Our previous Visual Narrator tool automatically extracts conceptual models from user stories by means of Natural Language Processing techniques. Its aim is to reduce cognitive overload through requirements visualizations [3]. Our evaluation [2], however, shows these models *quickly become too large* for practitioners to effectively process.

Models quickly beome too big

Research goal:

To deliver conceptual models that are easy to read, so discussion is facilitated and software requirements are improved as a result.

Solution

Use requirements visualization with Shneiderman's visual information seeking mantra: "overview first, zoom/filter, details on demand" [4] to create a readable and interactive conceptual model. Support defect detection to improve requirement quality [5].

Core Functionality:

- Zoom in/out on specific areas
- Filter only the most important entities
  - Filter per sprint an/or role
  - Turn relationships on/off
  - View full user stories

Ambiguity resolution Duplicate prevention Conflict detection

Workflow & Architecture

- Interactive Narrator uses Visual Narrator to extract entities and relationships from the user stories.
- The entities represent nouns. For example: Visitor, Event, Tickets
  - The higher the frequency, the larger the circle.
  - Roles are depicted with a human icon
- The relationships represent verbs. For example: Choose, Buy
  - Generalization relationships have a dotted line
- The relationships are depicted as lined connections between the entities.

Results from Ongoing Evaluations

Method

Explorative case studies with 5 participants from software companies were conducted. The participants used the tool on a 84 inch 'video wall' touch screen.

Findings

- It creates an overview, a 'bigger picture' of a project
- Relationships help to identify connections between entities
- The automatic and quick generation of the visualization is attractive
- Models can be cognitively processed easily after a short run-up time
- It creates a broader understanding of requirements, but not a deeper one
- It can help to identify *redundancies*, *inconsistencies* and *dependencies*

Usage on the 'video wall' during a meeting

Conclusions and Future Work

The Interactive Narrator is able to automatically and quickly create conceptual models from user stories. The filtering and zooming mechanisms increase the readability of the models to a usable level. Because of the relationships, interactive capabilities and the abstraction of the data in user stories the tool facilitates discussion and can help to make requirements better.

Future work includes:

1. Improving support for the detection of redundancies, inconsistencies and dependencies.
2. Implementing semantics-based clustering to further reduce visual clutter.
3. Implementing capabilities to edit user stories from the visualization.

References

1. Kassab, M.: An Empirical Study on the Requirements Engineering Practices for Agile Software Development. In: Proc. of the EUROMICRO Conference on Software Engineering and Advanced Applications. pp. 254–261 (2014).
2. Lucassen, G., Robeer, M., Dalpiaz, F., van der Werf, J.M.E.M., Brinkkemper, S.: Extracting conceptual models from user stories with Visual Narrator. Requirements Engineering. 22, (2017).
3. Abad, Z.S.H., Noaeen, M., Ruhe, G.: Requirements Engineering Visualization: A Systematic Literature Review. In: Proc. of the IEEE International Requirements Engineering Conference. pp. 6–15 (2016).
4. Shneiderman, B.: The eyes have it: A task by data type taxonomy for information visualizations. In: Proc. of the IEEE Symposium on Visual Languages. pp. 336–343 (1996).
5. Dalpiaz, F., van der Schalk, I., Lucassen, G.: Pinpointing Ambiguity and Incompleteness in RE via Information Visualization and NLP. In: Proc. of the International Working Conference on Requirements Engineering: Foundation for Software Quality (2018).

Contact

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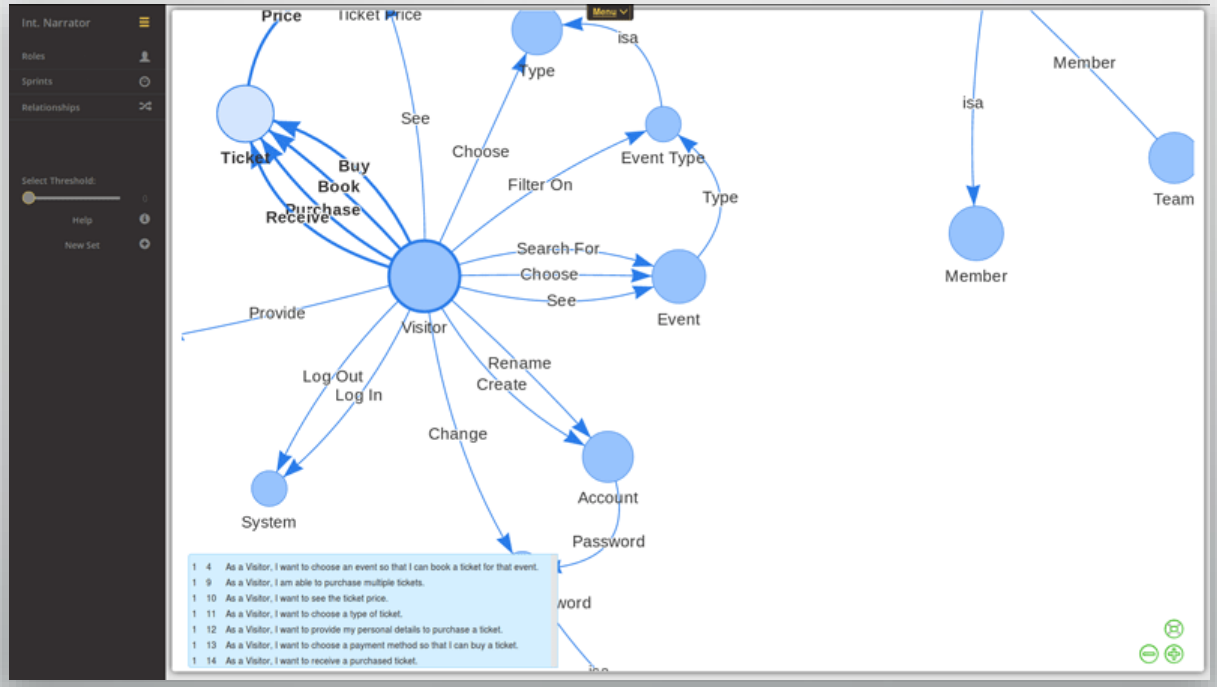
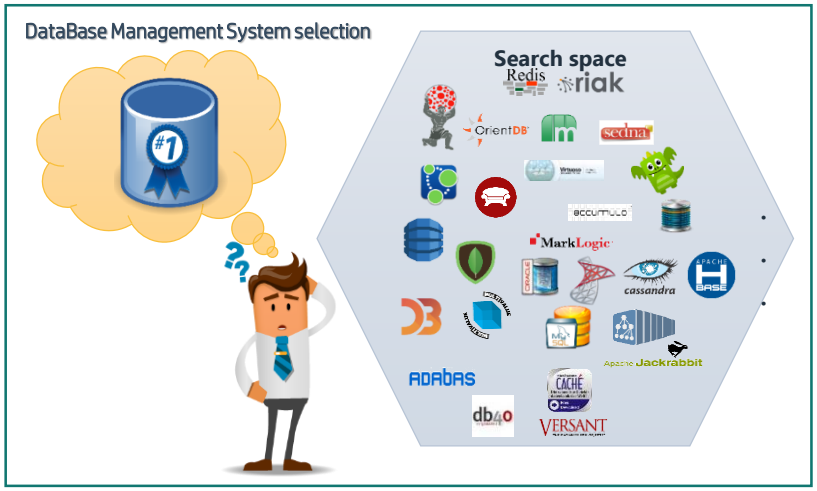
Can we create a visual representation of requirements that is comprehensible and helps to improve (understanding of) requirements?

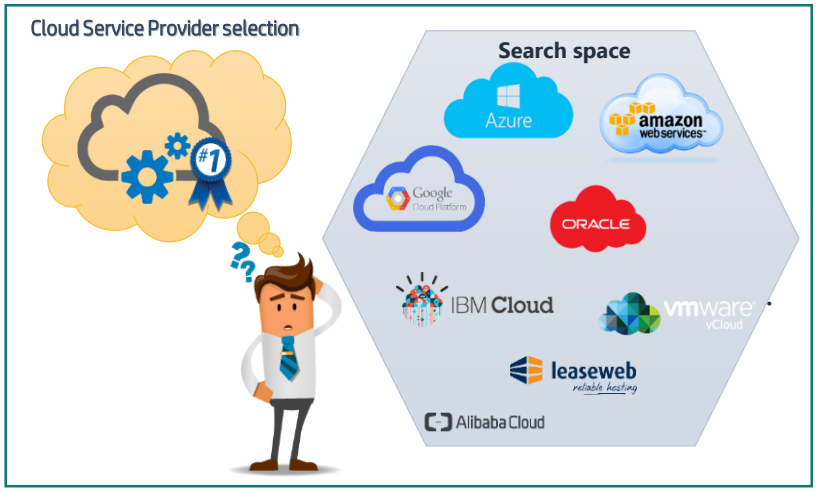


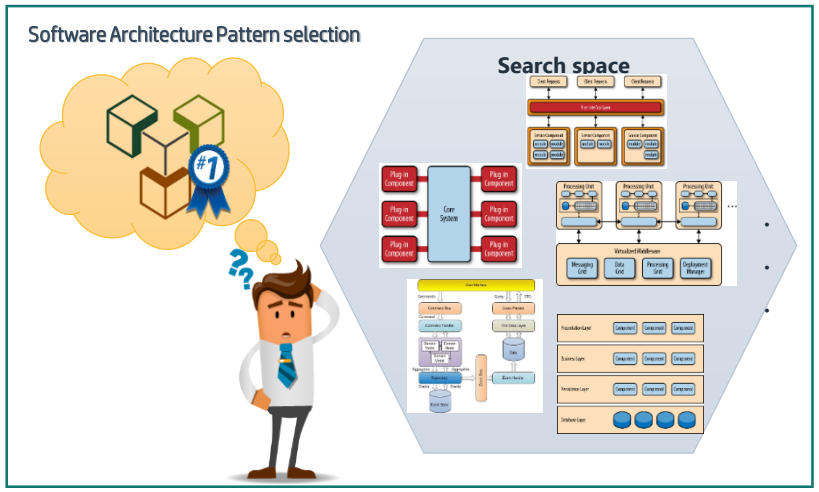
Multiple Criteria Decision Support in Requirements Negotiation

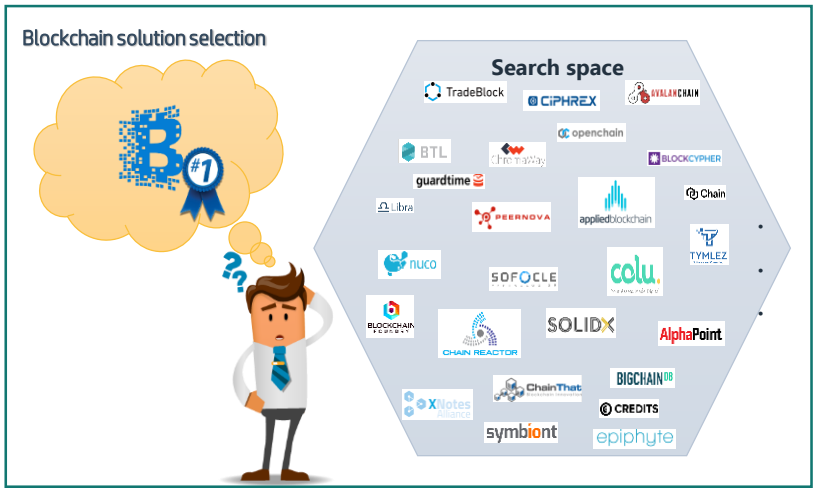
Siamak Farshidi, Slinger Jansen, Rolf de Jong, Sjaak Brinkkemper

Multi-Criteria Decision-Making (MCDM) Problems









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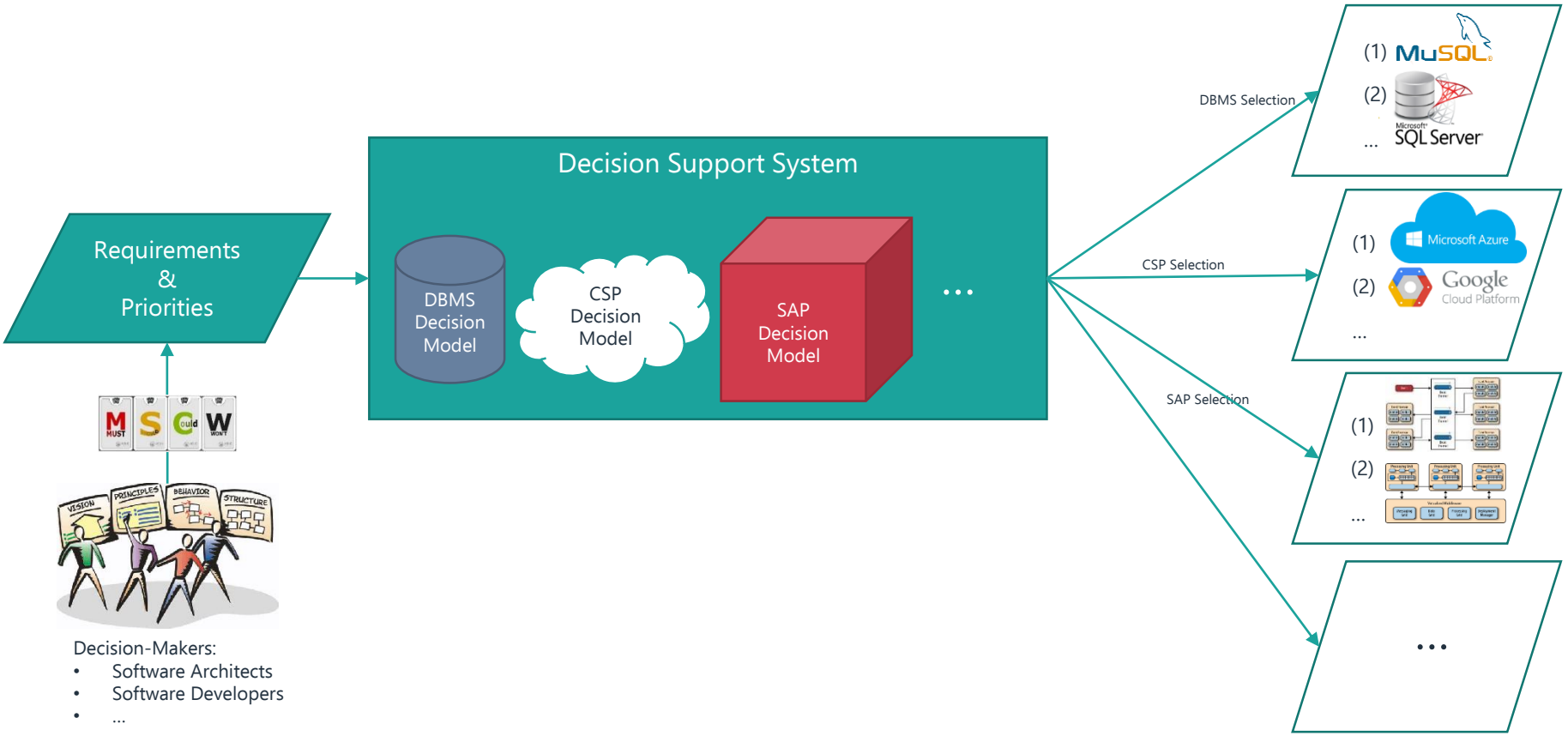
Decision Support System



Decision-Makers:

- Software Architects
- Software Developers
- ...

Elicitation of SME Requirements for Cybersecurity Solutions by Studying Adherence to Recommendations

To mitigate SME cybersecurity problems, we aim to do requirements elicitation by studying how cybersecurity experts provide advice to SME.

SMEs characteristics regarding cybersecurity:

- Lack of investment and budget restrictions
- Lack of security awareness and skills
- Lack of cost-effective processes
- Concerning external threats and neglecting internal ones
- A lack of internal cyber security policy

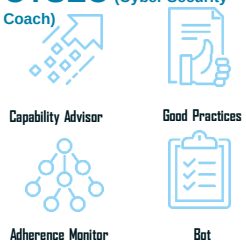
Some cyber threats specific to SME:

- Vulnerable Software
- Injection
- Malicious insiders
- Broken Authentication
- Denial of Service
- Insecure Direct Object References
- Sensitive Data Exposure
- Bad Configurations

Cybersecurity Solution for SME

Requirements Elicitation

CYSEC (Cyber Security Coach)



- Including a questionnaire covering different cybersecurity capabilities referencing good practices
- Providing SME with relevant information for training and tools for download
- Helping cybersecurity experts to evaluate their approaches
- An interactive element for QGA

We aim to answer

- What are the hurdles and enablers of SME to adopt cybersecurity solutions?
- Can the study of adherence to cybersecurity practice be used as a method of requirements elicitation for improving cybersecurity solutions?
- Can requirements elicitation be automated by embedding the dialogue between the cybersecurity expert and the person in charge of the SME in the CYSEC tool?

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Fachhochschule Nordwestschweiz
Hochschule für Technik

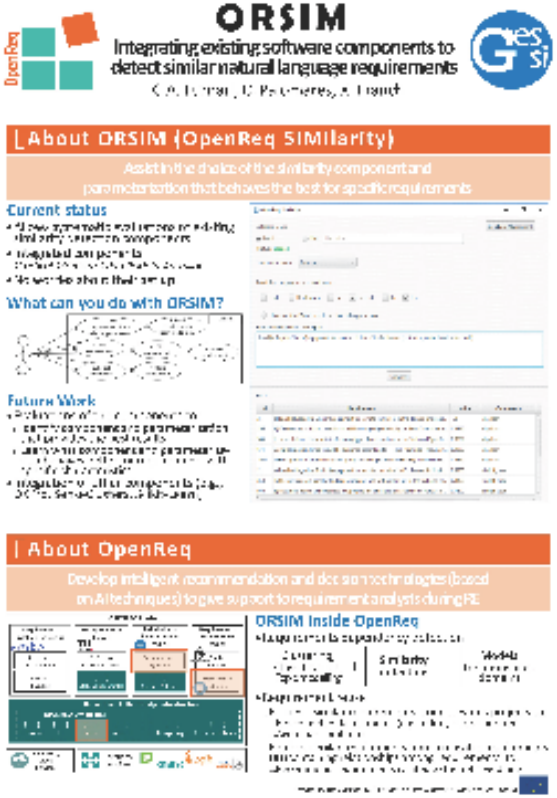
Utrecht University

ORSIM – *OpenReq SIM*ilarity

Integrating existing software components to detect similar NL requirements

C.A. Furnari, C. Palomares, X. Franch

- Systematic evaluation of existing similarity detection components for NL texts
- No worries about components' set up!
- Integrated components:
  - Cortical
  - Gensim
  - Paralleldots
  - Semilar
- Basics for other tasks: reuse, dependencies



Managing Multi-Lingual User Feedback: the SUPERSEDE project experience

An experience report

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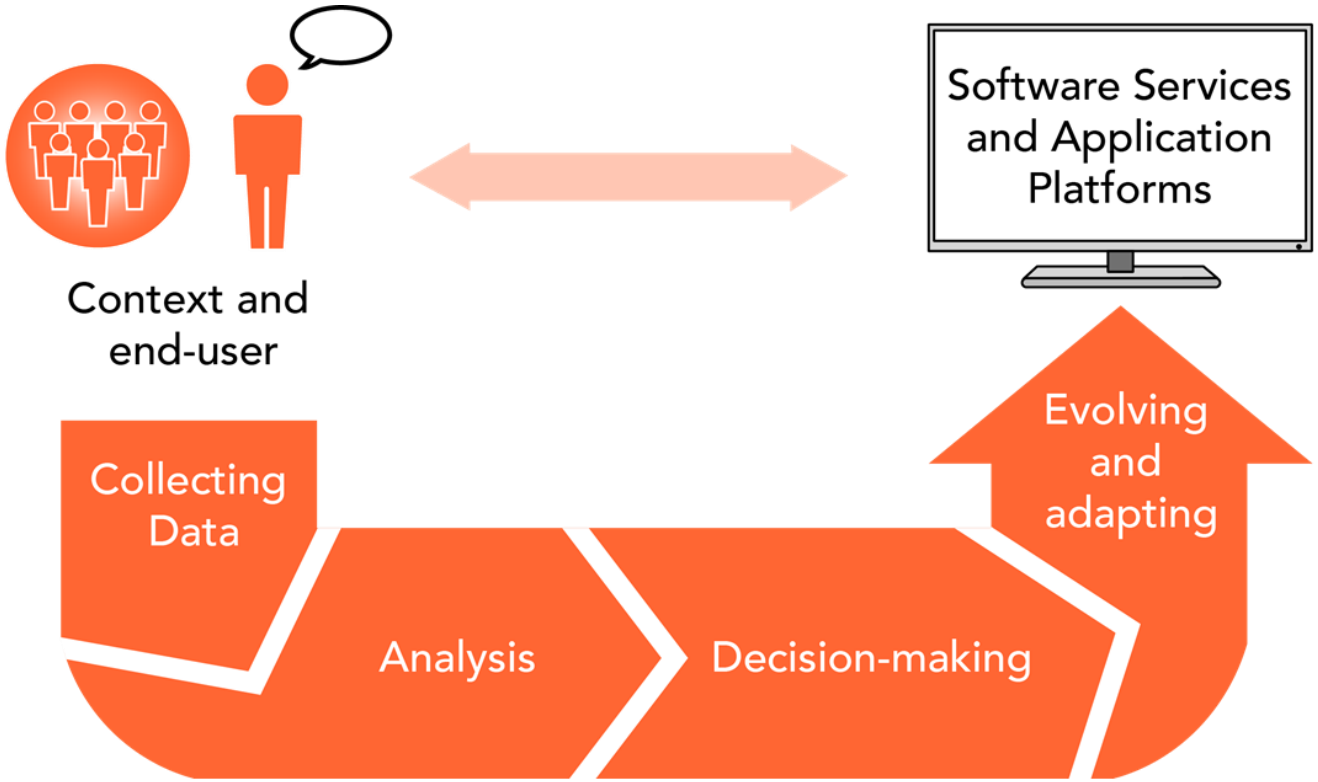
HORIZON 2020

SUPERSEDE Objective

Enable a data-driven engineering process



Textual feedback analysis process

1. *Dataset preparation*: manual annotation is performed by a domain expert
2. *Pre-processing:* uninformative tokens are removed
3. *Feature extraction*: different linguistic properties and sentiment are extracted
4. *Building a Feedback classifier:* machine-learning techniques are employed to train a classifier on a (portion of the) dataset
5. *Feedback classification:* the Feedback classifier is applied to incoming feedback to classify it as Bug Report, Feature Request, Enhancement Request, and Other

What if you discover later, when project is already running, that **user textual feedback is not only in English**?

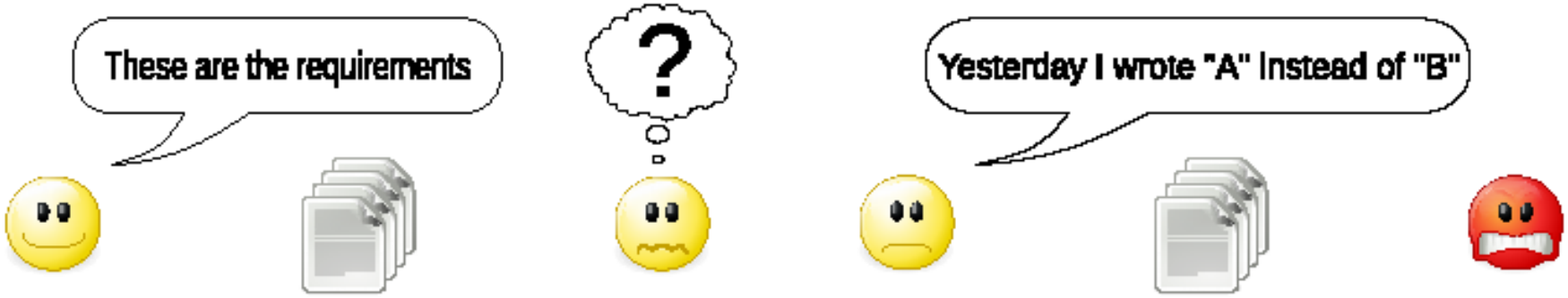
Defect Detection and Machine Learning for Requirements Engineering: a Roadmap

A. Fantechi, P. Frasconi, G. Gori, F. Orsini, M. Papini

UNIVERSITÀ DEGLI STUDI FIRENZE

Context description: Early stages ideas and challenges in the application of Machine Learning techniques to defect detection in Natural Language requirements.

- All requirements depend on domain knowledge.
- Domain-specific concepts and terminology.
- Requirements need to be tailored for each customer.



Artwork from "GNOME Project" - http://www.gnome.org

Back to Basics: Extracting Software Requirements with a Syntactic Approach

REFSQ'18 | March 20th, 2018

Matthew Caron

Paderborn, University

Motivation


non-experts
extraction
crowdsourcing
custom
supervised
processing
unfiltered
vision
inconsistency
non-expert
data
svo
rule-based
api
research
process
software
complements
vagueness
incompleteness
algorithm
developers
natural language
technical
syntactic
software requirements
validation

Focus

Back to Basics: Extracting Software Requirements with a Syntactic Approach

Motivation

- Companies need, more than ever before, solutions tailored to their exact needs
- **Custom software solutions** are not always available and need to be developed anew
- **Fundamental challenge:** *Extracting and understanding software requirements written in natural language*

Vision

- **Syntactic rule-based extraction tool** for software requirements
- **Main objectives:**
  - Allow **non-expert users** to voice their needs in **unfiltered natural language**
  - Provide developers with **comprehensive**, **structured**, and **complete information**

Ongoing → Summer 2018 → Winter 2018

Phase 1

- Identification and extraction of **Subject-Verb-Object triples** (SVO)
- Identification and extraction of **complements**
- Identification and extraction of **negative words**
- **Sequential ordering** *(Lexicon-based)*
- **Disambiguation**

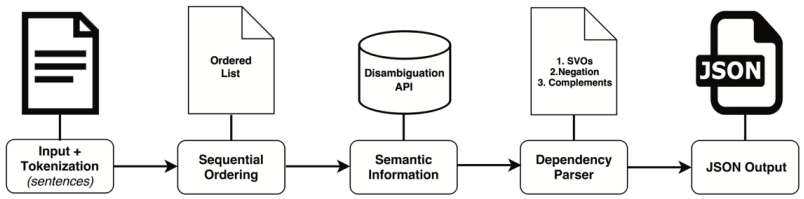
Phase 2

- Refinement of the **syntactic rule-based extraction algorithm** based on **crowdsourced data**
- Development of a **classification model** for the **validation** of extracted requirements
- Improvement of the **sequential ordering algorithm**

Phase 3

- Detection and handling of **inconsistency**
- Detection and handling of **incompleteness**
- Detection and handling of **vagueness**

Architecture | Phase 1



UNIVERSITY OF TRENTO - Italy

Information Engineering and Computer Science Department

PACAS: A Gamified Platform for Participatory Change Management in ATM Systems

Elda Paja[1], Mauro Poggianella[1], Fatma Başak Aydemir[2], Paolo Giorgini[1]
[1]University of Trento and [2]Utrecht University

Utrecht, March 20, 2018

SESAR JOINT UNDERTAKING

Founding Members

EUROPEAN UNION EUROCONTROL

PACAS
Participatory Architectural Change MAnagement in ATM Systems

A Gamified Platform for Participatory Change Management in ATM Systems

Elda Paja[1], Mauro Poggianella[1], Fatma Basak Aydemir[2], and Paolo Giorgini[1]

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SESAR JOINT UNDERTAKING

PACAS OVERVIEW

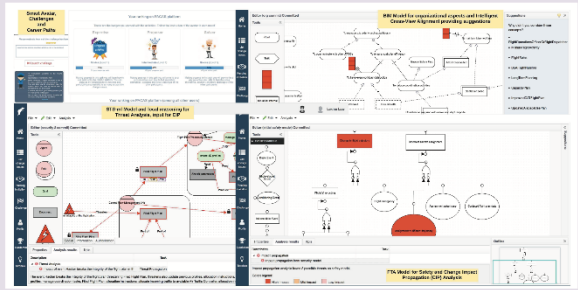
The main objective of PACAS is to better understand, model and analyse changes at different layers of the Air Traffic Management (ATM) system to **support change management**, while capturing how strategic and design **choices influence the overall system**. PACAS relies on three main pillars:

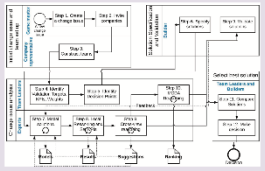
PILLAR #1	PILLAR #2	PILLAR #3
Gamified experience	**Multi-view modelling**	**Automated reasoning techniques**

PACAS PROCESS & PLATFORM

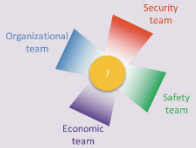
PLATFORM DESIGN

CHANGE MANAGEMENT PROCESS





The PACAS change management process analyses change by different teams, one for each aspect (aka Key Performance Area - KPA). We support four default KPAs, namely security, safety, economic and organizational, to decide on the best solution (option) that is a trade-off.



Web-based
https://pacas.disi.unitn.it/pacas-review/

Modular
Extendable - add new languages

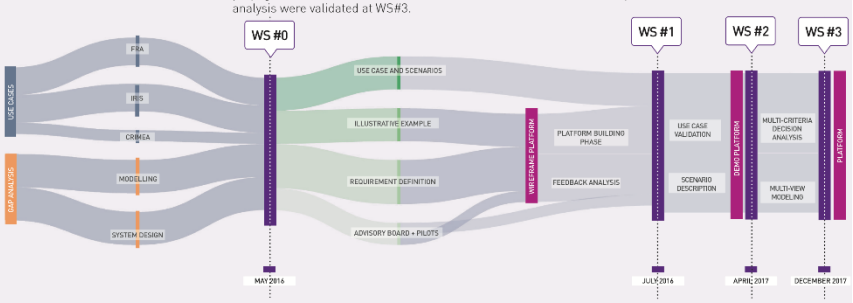
Reasoning as services
Easily integrate new techniques

REQUIREMENTS DEFINITION

CONCEPT VALIDATION

VALIDATION

The validation consists of an iterative process with the active participation of an external Advisory Board (AB) of domain stakeholders throughout the whole duration of the project. The first two phases, "Requirements" and "Use case" definition have been validated through Workshops WS#0 and WS#1, along the first wireframe prototype of the platform supporting multi-view modelling. Change impact propagation has been validated in WS#2, while the final version of the platform and the multi-criteria decision analysis were validated at WS#3.



SESAR
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Consortium

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The PACAS platform

Web-based
Available and can be used freely

Automated reasoning as a **services**
Integrate easily new services

Modular
Extendable

Support for new languages