RE PAPERS:
Legal & Privacy Requirements

Weds 11:00-12:30
FB6 Auditorium
Chair: Jaelson Castro

Automated Text Mining for Requirements Analysis of Policy Documents

Aaron K. Massey[1], Jacob Eisenstein[1], Annie I. Antón[1], and Peter P. Swire[2]
Georgia Institute of Technology[1]
Ohio State University[2]

Can requirements engineers use text mining to examine challenging-to-read policy documents for requirements artifacts on an industry-wide scale?

the **p r i v a c y p l a c e** . o r g   1   Georgia Institute of Technology

Monday, April 15, 13

Carnegie Mellon University

Formal Analysis of Privacy Requirements Specifications for Multi-Tier Applications

Travis Breaux and Ashwini Rao

In a complex application ecosystem with multiple privacy policies and stakeholders, we enable identification of conflicting data privacy requirements, and data repurposing.

isr institute for SOFTWARE RESEARCH

An Empirical Investigation of Software Engineers' Ability to Classify Legal Cross References

Jeremy C. Maxwell, Annie I. Antón, and Julie B. Earp

- Examined the ability of software practitioners to classify legal cross references
- Participants from 41 EHR companies & 220 healthcare, IT vendors, and gov't agencies
- Practitioners used our Cross-Reference Taxonomy (RE'11 Distinguished Paper)
- Findings
  - Software practitioners not well equipped to understand regulatory req'ts
  - Experienced practitioners understand regulatory req'ts better

RE@21 PAPERS: Keeping Requirements on Track
Weds 11:00-12:30, Padre Anchieta Auditorium (Chair: Bashar Nuseibeh)

A History of the International Requirements Engineering Conference (RE)[RE@21]

Author: Nancy Mead

This paper traces the history of the RE conference from its inception through the present, with insights from key players, and discussion of future directions:

- Find out why the conference was started
- Learn what was planned and what was accidental
- Witness the twists and turns of the conference structure over time
- Add your own insights to the discussion of future directions

Software Engineering Institute | Carnegie Mellon   Software Assurance Competency Model   Nancy Mead, Date   © 2012 Carnegie Mellon University   1

A Review of Traceability Research at the Requirements Engineering Conference
(RE@21)

Sunil Nair, Jose Luis de la Vara and Sagar Sen

Traceability research @ RE is on track!!

But, does it meet our needs yet?

Certus   sfi Centre for Research-based Innovation

Models in the RE Series
Stephen Morris

Every year a stampede of models passes through RE, and every year this herd is composed differently, defying proper classification but demanding some direction.

A Vision for Generic Concern-Oriented Requirements Reuse[RE@21]

Gunter Mussbacher, Jörg Kienzle

Let's discuss arguments for our requirements / software engineering vision focusing on coordinated composition of generic, reusable, not-product-specific artifacts across the whole software development life cycle!
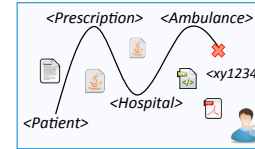
CORE

RE PAPERS:

Automated Traceability

Weds 14:30-16:00
FB6 Auditorium
Chair: Barbara Peach

MISSISSIPPI STATE
UNIVERSITY

2013 RE

Back to Nature
Restoring Lost Traceability Tracks through Refactoring

<Prescription>   *<Ambulance>*

<Hospital>   *<xy1234>*

<Patient>

Join us for the presentation of *"Supporting Requirements Traceability through Refactoring"*

Anas Mahmoud and Nan Niu

Foundations for an Expert System in Domain-Specific Traceability
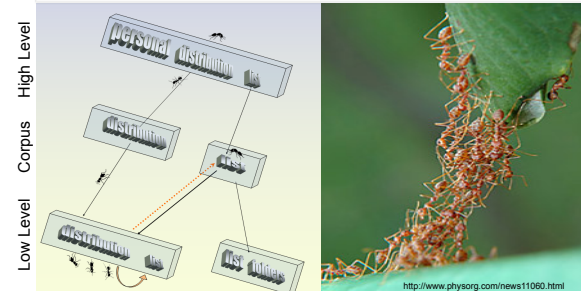
Jin Guo, Jane Cleland-Huang, and Brian Berenbach
(DePaul University, USA; Siemens, USA)

This paper explores how to integrate expert systems into the automated tracing process; it attempts to address the terminology-mismatch problem faced by conventional trace retrieval techniques.

Rationales for Tracing
Domain Knowledge
Semantic Info.
Artifacts

Application of Reinforcement Learning Techniques to Requirements Engineering: Requirement Tracing
Hakim Sultanov, Jane Huffman Hayes
University of Kentucky, Lexington, KY. USA

High Level   Corpus   Low Level

personal   distribution   list

distribution

list

distribution   list   distribution   list notice

http://www.physorg.com/news11060.html

Unstructured artifact tracing is improved by using reinforcement learning techniques, examining the context of words as opposed to treating artifacts as a "bag of words"

RE PAPERS:
Industry Challenges & Research Needs

Weds 14:30-16:00
Padre Anchieta Auditorium
Chair: Marjo Kauppinen

DTU

GCU
Glasgow Caledonian University

Danfoss

We'll describe real projects that show when design information is viable in requirements specifications and when it should be avoided.

Juha Savolainen, Danfoss Power Electronics A/S, Denmark
Dagny Hauksdottir, DTU, Denmark
Mike Mannion, Glasgow Caledonian University, UK

Danfoss Power Electronics

Towards a Systematic Requirement-Based Test Generation Framework: Industrial Challenges and Needs

Authors:
Shokoofeh Hesari, Razieh Behjati, and Tao Yue

We discuss potentials and limitations of existing requirement-based test generation techniques in automating the reuse of test artifacts in product lines of cyber-physical systems.

[simula . research laboratory]

TUM

BMW GROUP · BMW · MINI · Rolls-Royce Motor Cars Limited

Why Feature Dependencies Challenge the Requirements Engineering of Automotive Systems: An Empirical Study

Andreas Vogelsang[1], Steffen Fuhrmann[2]
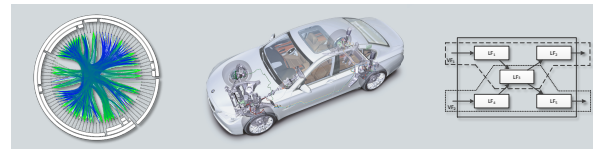
Feature dependencies in a real automotive system:
Numerous, pervasive, implicit, and in many cases unknown to developers.

[1] Technische Universität München, Institut für Informatik
[2] BMW Group, Driving Dynamics, Dimensioning Functions Driving Dynamics and Driver Assistance

RE PAPERS:
Formal Modeling

Weds 16:30-18:00
FB6 Auditorium
Chair: Zhi Jin

Don't wait until the end…

…verify your incomplete models!

On Requirements Verification for Model Refinements

**Carlo Ghezzi**   **Claudio Menghi**   **Amir Molzam Sharifloo**   **Paola Spoletini**

I. Krka and N. Medvidović:
Distributing Refinements of a System-Level Partial Behavior Model

USC **Viterbi**
School of Engineering

We assist the decomposition of system-level requirements to models of individual components **via requirements-driven heuristics** that overcome the incompleteness proven to be induced by direct decomposition.
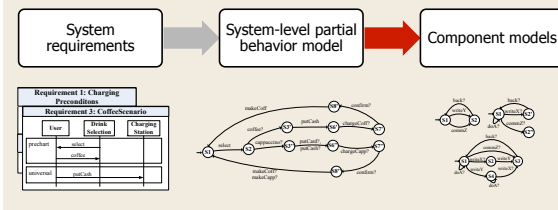
A Mode-Based Pattern for Feature Requirements, and a Generic Feature Interface

David Dietrich
Joanne M. Atlee
University of Waterloo

We propose a **pattern** for modelling feature requirements and an **interface** to features, which together may ease the readability and writability and feature requirements.
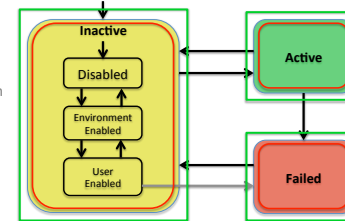
Example of one pattern instance

RE PAPERS:
Elicitation in Theory & Practice

Thurs 11:00-12:30
FB6 Auditorium
Chair: Stephen Morris

LANCASTER UNIVERSITY

Requirements Elicitation: Towards the Unknown Unknowns

Alistair Sutcliffe & Pete Sawyer

Donald Rumsfeld

"There are known knowns. These are things we know that we know. There are known unknowns. That is to say, there are things that we know we don't know. But there are also unknown unknowns. There are things we don't know we don't know."

so if you want to find out how to really find those unknown unknowns....... Reviews Requirements Elicitation techniques and tools, proposes road map for future research towards 'Unknown' requirements in brown/green field domains.

Early Phase Telemedicine Requirements Elicitation in Collaboration with Medical Practitioners

N. Larburu, I. Widya, R. G. A. Bults, H. J. Hermens, and C. Napolitano

Requirements elicitation using scenarios, with engineering and (telemedicine-) domain concerns' separation joined by a common discourse handshake, and application of model-based techniques to compensate missing primary-stakeholders.
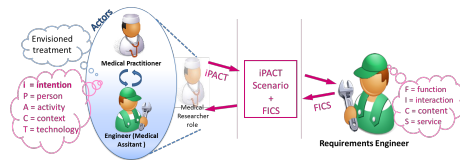
Cloud providers elicit consumer requirements **differently** from what you may think –
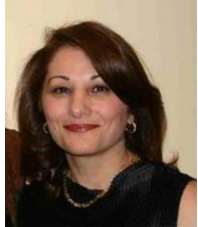We know **how** and **why**.

How Cloud Providers Elicit Consumer Requirements: An Exploratory Study of Nineteen Companies

Irina Todoran, Norbert Seyff and Martin Glinz
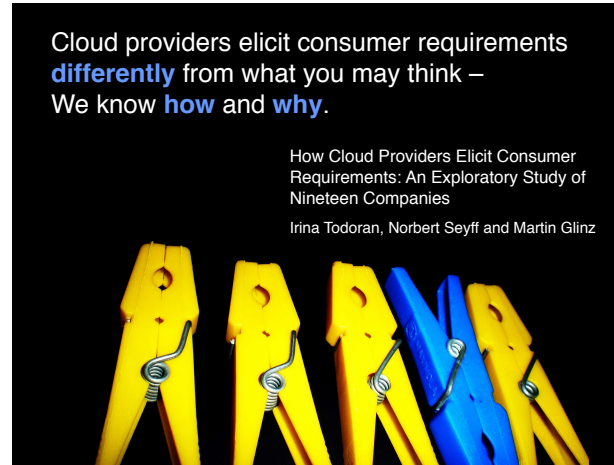
RE PAPERS:
New Perspectives on Requirements Sources

Thurs 14:30-16:00
FB6 Auditorium
Chair: Didar Zowghi

Visual Notation Design 2.0: Towards User Comprehensible Requirements Engineering Notations

Patrice Caire, Nicolas Genon
Patrick Heymans, Daniel Moody

WANT AN EFFECTIVE VISUAL NOTATION? DON'T LET THE EXPERTS DO IT, ASK THE USERS INSTEAD!

A novel approach to designing RE visual notations that improves end user comprehensibility by almost 300% compared to notations designed in the traditional way

Alternative Title: A Practical Application and Empirical Test of the Infinite Monkey Theorem

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User Feedback in the AppStore

An Empirical Study by Dennis Pagano & Walid Maalej

Explores feedback content and impact

Gives insights into crowdsourcing requirement

The Impact of *Domain Ignorance* on the Effectiveness of Requirements Idea Generation during Requirements Elicitation

Does **seeding** an industrial
requirements idea brainstorming session
with application-domain ignorant non-employees
improve brainstorming effectiveness
over brainstorming with only domain-aware employees?

Ali Niknafs, Daniel Berry

David R. Cheriton School of Computer Science
University of Waterloo
Waterloo, Ontario, Canada

International Requirements Engineering Conference   July 15th-19th, 2013. Rio de Janeiro, Brazil

RE PAPERS:
Handling Change

Thurs 16:30-18:00
FB6 Auditorium
Chair: Nelly Bencomo

LEARNING FROM EVOLUTION HISTORY TO PREDICT FUTURE REQUIREMENT CHANGES

A novel solution helps to downsize the workload of requirements volatility analysis by recommending a converging subset of change-prone requirements based on regression analysis.

FUTURE · PRESENT · PAST

ISCAS
中国科学院软件研究所
Institute of Software Chinese Academy of Sciences

Lin Shi, Qing Wang, MingShu Li
Institute of Software Chinese Academy of Sciences, Beijing, China

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Assessing Regulatory Change through Legal Requirements Coverage Modeling

- Distributed IT systems *span multiple jurisdictions* with their own data privacy and security regulations
- By creating *legal coverage models* we show how regulatory requirements can *change* when:
  - introducing a new product feature
  - outsourcing a service component abroad
  - facing a new or updated law

David G. Gordon
Engineering & Public Policy

Travis D. Breaux
Institute for Software Research

A Goal Model Elaboration for Localizing Changes in Software Evolution

▸ *Hiroyuki Nakagawa[1], Akihiko Ohsuga[1], Shinichi Honiden[2]*
  ▸ *UEC Tokyo[1], National Institute of Informatics[2], Tokyo, Japan*

▸ We propose an elaboration process for goal modeling that extracts control loops as highly independent modules, which localize changes in software evolution.

Elaboration process → **Control loops (= highly independent modules)**

Goal model → Elaborated goal model → System architecture
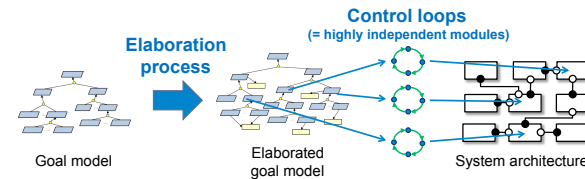
RE PAPERS:
Improving the Quality of Requirements in Practice

Thurs 16:30-18:00
Padre Anchieta Auditorium
Chair: Daniel M. Berry

John Terzakis
Intel Corporation, USA

The Impact of Requirements on Software Quality across Three Product Generations

This paper will demonstrate the impact that well-written, well-reviewed requirements had on software quality across three product generations.

Gen 1 -> Gen 2 achieved a **>50% decrease** in SW defects
Gen 2 -> Gen 3 achieved a **>33% decrease** in SW defects

(intel) Leap ahead™

"**REQUIREMENTS CLINIC:**
Third Party Inspection Methodology and Practice for Improving the Quality of Software Requirements Specifications"

Shinobu Saito, Mutsuki Takeuchi, Masatoshi Hiraoka, Tsuyoshi Kitani, Mikio Aoyama

✓ **Technical Contribution:**
PQM (Pragmatic Quality Model) based on IEEE Std.830 about SRS.
PBR (Perspective Based Reading) based Inspection method for independent Team.

✓ **Practical Benefit:**
We has been practiced "Requirements Clinic" for improving the quality of SRS for **2 years**. It demonstrated **10.6 ROI** for **12 projects**.
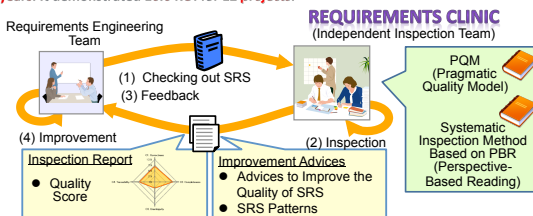
Using Defect Taxonomies for Requirements Validation in Industrial Projects

Michael Felderer
University of Innsbruck & QE LaB Business Services
Innsbruck, Austria
Michael.felderer@uibk.ac.at

Armin Beer
Beer Test Consulting
Baden, Austria
info@arminbeer.at

"This work shows how defect taxonomies are seamlessly integrated into the RE process and successfully applied for requirements reviewing and testing."

QE LaB Business Services

QE QUALITY ENGINEERING

RE PAPERS:
Directions in Decentralized RE

Fri 9:00-10:30
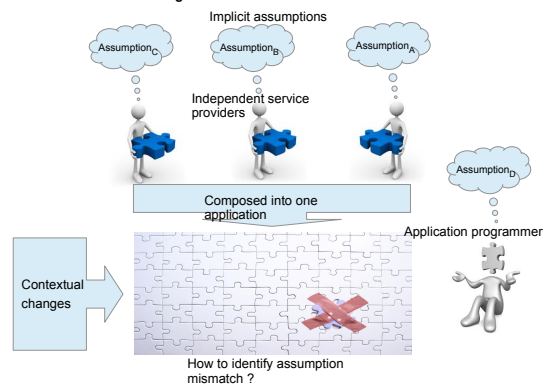**FB6 Auditorium**
Chair: João Araújo

Ongoing Software Development without Classical Requirements

Thomas A. Alspaugh and Walt Scacchi

*Open source software development doesn't use classical requirements artifacts and processes, yet it works —
what does it use instead, and how?*

Assumption-Based Risk Identification Method (ARM) in Dynamic Service Provisioning

Implicit assumptions

Assumption_C Assumption_B Assumption_A

Independent service providers

Assumption_D

Composed into one application

Application programmer

Contextual changes

How to identify assumption mismatch ?

Can *Requirements Dependency Network* **Be Used as Early Indicator of** *Software Integration Bugs* **?**
Empirically investigate how requirements dependencies **correlate with** and **predict** software integration bugs, which can provide early estimate regarding software quality.
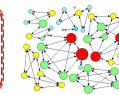
Junjie Wang, Juan Li, Qing Wang, Da Yang, Jason Zhang, Mingshu Li
Institute of Software, Chinese Academy of Sciences (ISCAS), Beijing, China

RE PAPERS:
RE Processes & Tools in Action

Fri 9:00-10:30
Padre Anchieta Auditorium
Chair: Neil Ernst

Requirements Engineering for the Uganda Police Force
Crime Records Management System

by

Andrew Muyanja, Paul Isaac Musasizi, Catherine Nassimbwa, Sandy Stevents
Tickodri-Togboa, Edward Kale Kayihura & Amos Ngabirano

This paper presents the experiences (techniques used & lessons learnt) of the
authors in developing requirements for the Uganda Police Force Crime
Records Management System

The 21st IEEE International Requirements Engineering Conference (RE'13), Rio de Janeiro, Brazil

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The Integration of an RE Method and AHP: A Pilot Study in a Large Swiss Bank

Arash Golnam, Gil Regev, Alain Wegmann   Sofia Kyriakopoulou

ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

SYSTEMIC MODELING LABORATORY LAMS

CREDIT SUISSE

Reporting on a Requirements Engineering Project at the
Intersection of Academia and Industry

Automatic Extraction of Glossary
Terms from Natural Language
Requirements

Anurag Dwarakanath, Roshni R. Ramnani, Shubhashis Sengupta
Accenture Technology Labs
Bangalore, India

Client

Developer

Value Proposition –
"**A tool to automatically identify Domain Concepts in a
Requirements' Document thus promoting consistent
interpretation among stakeholders and assisting
automated forward engineering**"

Images Source: www.success.com, www.search-best-cartoon.com, theunablogger.wordpress.com,
fullonbakwaas.blogspot.com, discoveryschoolelementary.blogspot.com, grinbin.com

Tester

RE PAPERS:
Traceability in Practice

Fri 11:00-12:30
FB6 Auditorium
Chair: Michael Panis

An Empirical Study on Project-Specific Traceability Strategies

Patrick Rempel, Patrick Mäder, and Tobias Kuschke

Motivation
- Practitioners rarely follow explicit traceability strategies
- How suitable is requirements traceability that is not strategically planned?

Study
- Interview study with 17 software projects

Results
- All software projects struggled with…
  - Ambiguous artifacts, volatile traces, and mismatches between development goals and existing traceability
- Developed analysis procedure facilitates self-evaluation of practitioners

ILMENAU UNIVERSITY OF TECHNOLOGY

Title: An Approach to Carry Out Consistency Analysis on Requirements: Validating and Tracking Requirements through a Configuration Structure

By Padmalata Nistala & Priyanka Kumari

Problem Area:
- Alignment and consistency of requirements is a challenge: 30- 40% of software defects can be traced to gaps or errors in requirements
- Inadequate granularity and holistic approach in current requirements validation and traceability approaches.

Proposed Solution:

|	
Layers / Configuration Items	a multi layered requirement model to ensure the alignment of requirements right from the business goals to the software specifications.
Configuration Structure	A configuration structure to link and track the requirement items for each layer.
Consistency Analysis	A consistency analysis method to identify the inconsistencies in the requirements structure.
Requirement Consistency Index	A consistency index computation to indicate the level of consistency in overall requirements of the software system.

Value Proposition: An Approach to identify inconsistencies in requirements and Compute Requirement consistency index (RCI) for overall requirements to provide a quantifiable measure on requirement quality.

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Experience certainty.

1

Mississippi State University   Department of Computer Science and Engineering

Find out how visual requirements analytics helps create an efficient path from data to decision.
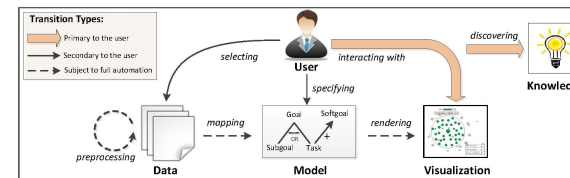
Join us for the presentation of "Keeping Requirements on Track via Visual Analytics" by Nan Niu, Sandeep Reddivari, and Zhangji Chen

1