Automated Text Mining for Requirements Analysis of Policy Documents
Aaron K. Massey¹, Jacob Eisenstein¹, Annie I. Antón¹, and Peter P. Swire²
Georgia Institute of Technology¹
Ohio State University²
Can requirements engineers use text mining to examine challenging-to-read policy documents for requirements artifacts on an industry-wide scale?

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 PAPERS:
Legal & Privacy Requirements
Weds 11:00-12:30
FB6 Auditorium
Chair: Jaelson Castro

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.

Carnegie Mellon University
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

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?

A Vision for Generic Concern-Oriented Requirements Reuse
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!
Automated Traceability

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

RE PAPERS:

Automated Traceability

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.

Back to Nature
Restoring Lost Traceability Tracks through Refactoring

Join us for the presentation of “Supporting Requirements Traceability through Refactoring”
Anas Mahmoud and Nan Niu

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

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”
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.

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

Andreas Vogelsang1, Steffen Fuhrmann2

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, Controlling Functions, Driving Dynamics and Driver Assistance
RE PAPERS: Formal Modeling

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

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

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.

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On Requirements Verification for Model Refinements

Don't wait until the end…

…verify your incomplete models!

Carlo Ghezzi Claudio Menghi Amir Motzam Sharifloo Paola Spoletini

A Mode-Based Pattern for Feature Requirements, and a Generic Feature Interface

We propose a pattern for modelling feature requirements and an interface to features, which together may ease the readability and writability and feature requirements.
RE PAPERS:
Elicitation in Theory & Practice

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

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. Buls, 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
Inna Todoran, Norbert Seyff and Martin Glinz

Cloud providers elicit consumer requirements differently from what you may think – We know how and why.
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

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

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**

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**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.

Lin Shi, Qing Wang, Mingzhu 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

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**A Goal Model Elaboration for Localizing Changes in Software Evolution**

- Hiroyuki Nakagawa¹, Akihiko Ohsuga¹, Shinichi Honiden²
  - UEC Tokyo¹, National Institute of Informatics², Tokyo, Japan

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

David G. Gordon
Engineering & Public Policy

Travis D. Breaux
Institute for Software Research

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**Control loops (= highly independent modules)**

Elaboration process

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

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."
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

Assumption-based Risk Identification Method (ARM) is an approach used to identify and manage risks in dynamic service provision. It helps in understanding the assumptions made by different service providers and their implications on the overall service system.

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, Mingchu Li
Institute of Software, Chinese Academy of Sciences (ISCAS), Beijing, China
The Integration of an RE Method and AHP: A Pilot Study in a Large Swiss Bank

Arash Golnam, Gil Regev, Alain Wegmann

Sofia Kyriakopoulou

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

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Sofia Kyriakopoulou

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

Value Proposition —
“A tool to automatically identify Domain Concepts in a Requirements’ Document thus promoting consistent interpretation among stakeholders and assisting automated forward engineering”

Automatic Extraction of Glossary Terms from Natural Language Requirements

Anurag Dwarakanath, Roshni R. Ramnani, Shubhashis Sengupta

Accenture Technology Labs

Bangalore, India

RE PAPERS: Traceability in Practice

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

An Empirical Study on Project-Specific Traceability Strategies
Patrick Rampal, 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

Proposed Solution:
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.

Layers / Configuration Items
- Configuration Structure
- Consistency Analysis
- Requirement Consistency Index

A multi layered requirement model to ensure the alignment of requirements right from the business goals to the software specifications.
A configuration structure to link and track the requirement items for each layer.
A consistency analysis method to identify the inconsistencies in the requirements structure.
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.

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