Managing Requirements Knowledge

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Editors

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Preface

The Story

This book synthesizes the work of the managing requirements knowledge (MARK) community during the last 5 years. The first idea to organize a workshop on this topic came to our minds in winter 2007. We were both working on our Ph.D. projects at the Technische Universität München (TUM) under the supervision of Bernd Brügge. Anil was focusing on software product lines, while Walid was looking at the application of ontologies and machine learning to collaborative software engineering, in particular during bug fixing and API reuse. Our fields of interest seemed divergent at first glance. However, after a couple of discussions – also with colleagues from industry – we found that some of the problems we were trying to address are very similar. Valuable experiences and knowledge gained in the course of software projects, in particular during the work with requirements, remain tacit in the mind of people. The same problems in understanding and implementing requirements occur again and again.

We were convinced about the need for a new perspective on requirements – considering them as a knowledge asset in software organizations – in addition to the engineering and lifecycle perspectives. We were convinced about the huge potentials of recent trends such as ontologies, wikis, Web 2.0, recommendation systems, and data mining, to the requirements engineering community.

In the last years, the MARK workshop successfully took place in Barcelona, Atlanta, Sydney, and Trento. It has been one of the most successful workshops at the IEEE International Conference on Requirements Engineering that is based on submission and registration statistics, as well as the feedback of the participants. The achievements are remarkable. Novel approaches such as "recommending features and stakeholders by analyzing requirements repositories" or "using semantic wikis to represent and reason about requirements" have found their way to main conferences and journal in the field. Some of the tools are already being used in practice.

With this book, we hope to present a baseline for the community discussion, enabling more people to join and contribute. We also hope to bring more research questions and initiate even more discussions. Managing requirements knowledge is a new evolving field. Its requirements and its knowledge are evolving as well. We invite you to contribute. Enjoy reading!

The Structure

In addition to the introduction and conclusion chapters, which motivate the field, introduce the foundations and definitions, overview the approaches proposed so far, and discuss the road ahead, the rest of this book is structured into five parts.

Part I. Identifying Requirements Knowledge shows the importance of identifying and externalizing tacit knowledge about requirements such as rationale and presuppositions. It covers theoretical frameworks to model tacit knowledge, empirical studies to investigate mining requirements knowledge from project artifacts, as well as pragmatic and practical discussion on what is requirements knowledge in practice and how to manage without introducing additional overhead.

Part II. Representing Requirements Knowledge for Reuse introduces techniques such as patterns and ontologies to represent requirements knowledge for both humans and machine, enabling an efficient knowledge access for various stakeholders. We focus on techniques which support reuse of knowledge within and between software projects.

Part III. Sharing Requirements Knowledge is about people, i.e., requirements stakeholders, and the exchange of knowledge among them. This part discusses knowledge-sharing tools such as social media and Web 2.0 for requirements as well as methodologies such as agile requirements and question asking.

Part IV. Reasoning About Requirements discusses how to reason about the interdependencies of requirements and their knowledge. The goal is to check consistency and derive new knowledge. Also the integration of requirements knowledge into other software engineering knowledge is discussed.

Finally, *Part V Intelligent Tool Support* focuses on the tool perspective, and on how to apply novel techniques such as recommendation systems, experience-based tools, as well as integrated development environments to deal with the information overload, and the huge amount of knowledge related to requirements in large, complex, distributed projects.

The Audience

There are no special prerequisites to read this book. We tried our best to address the needs of the following target groups:

- Researchers from the area of knowledge management with interests on requirements engineering
- Researchers from the area of requirements engineering with interests on knowledge management
- Industrial practitioners involved in requirements engineering and outsourcing projects
- Lecturers, students, and practitioners interested in the state of the art of requirements engineering

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