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**Introduction**

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## Table of Contents. 16th Workshop on Requirements Engineering. Proceedings of WER 2013, Montevideo, Uruguay, April 8-10, 2013

## Preface. Nelly Condori-Fernandez, Leandro Antonelli. 16th Workshop on Requirements Engineering. Proceedings of WER 2013, Montevideo, Uruguay, April 8-10, 2013.

**Empirical Requirements Engineering**

## Quality Properties Evaluation for Software Requirements Specifications: An Exploratory Analysis.

*Roxana Saavedra, Luciana Ballejos and Mariel Ale.*

Most software problems arise from deficiencies in the manner in which software requirements are elicited and expressed. Ensuring that the Software Requirements Specification document (SRS) has the necessary quality is crucial to the success of any software development project, since its information is used across all project stages. However, assessing the quality of a SRS is not a simple process, mainly by the multitude of proposals, often contradictory, of the attributes to be evaluated and the methodologies used for that purpose. This work is intended to be a compendium of the most important tendencies and strategies in the field that serves as a starting point for developing comprehensive models for quality attributes evaluation in a SRS.

## Analyzing the Use of an Enterprise Model as a Stakeholder Requirements Model: An Experiment. (short paper).

*Fábio Levy Siqueira and Paulo Sergio Muniz Silva.*

Enterprise models are used in software development to understand the existing organization, to homogenize the stakeholder's knowledge, and to understand how the new software affects the organization and can improve its productivity. Another possibility is to use them as a stakeholder requirements representation. To analyze the use of an enterprise model as a stakeholder requirements model, this study presents an experiment. The experiment was conducted with graduate students who received either a textual problem statement or an enterprise model (representing the stakeholder requirements) and refined it into use cases (representing the software requirements). The result was evaluated considering the use case quality and the time spent, for two different scopes.

## Introducing Use Cases in a small Organization: An Experience and Lessons Learned. (short paper)

*Dolors Costal, Xavier Franch, Luis Delgado and Carme Jiménez.*

In this paper we report the adoption of use cases by a small organization in a university setting. Use cases were first introduced in the middle of a huge project and adopted thereafter for later projects. The paper mostly focuses in the first experience, whose most interesting characteristics were the large size of the resulting specification, the fact that it took place once the project had started (for documentation purposes instead of driving the development) and the limitation that resources allocated were not as much as required. The large size and resource limitation required prioritization of use cases and also the clear definition of a use case template. The late starting point required synchronization with the existing system requirements document and the running system itself. We present at the end the lessons learned from this experience.

**Systematization of the Requirements Process**

## GT4CCI: An Approach Based on Grounded Theory for Crosscutting Concerns Identification in Requirements Documents.

*Larissa De Alencar Sobral and Lyrene Fernandes Da Silva.*

When crosscutting concerns identification is performed on the activities involved in requirements engineering there are many gains in terms of quality, cost and efficiency throughout the lifecycle of software development. However, despite these gains, this identification faces several difficulties such as the lack of systematization and tools that support it and the difficult to justify why some concerns are identified as crosscutting or not, since this identification is often made without any methodology that systematizes and bases it. In this context, this paper proposes and evaluates an approach based on Grounded Theory, called GT4CCI, for systematizing the process of identifying crosscutting concerns in requirements document. Through the use of GT4CCI it is possible to better modularize the requirements document, make it more consistent, detect possible failures and improve traceability among requirements, adding significant gains in terms of quality and reliability to crosscutting concerns identification and to requirements engineering.

## A Semi-Automatic Strategy to Identify Crosscutting Concerns in PL-AOVgraph Requirement Models.

*Maíra Medeiros, Lyrene Silva and Ana Luisa Medeiros.*

The Requirements Engineering area faces problems because the requirements are often ambiguous, incomplete or confusing. These points are commonly obscured by the natural language, which abstracts the complexity of interactions among requirements. However, these interactions need to be analyzed because they influence how the software development life-cycle activities can be modularized from a well formulated and concise requirements description. In this context, PL-AOVgraph is an aspect-oriented requirement modeling language, which offers support to represent relationships among concerns and provide separation of crosscutting concerns. However, in order to identify these crosscutting concerns in PL-AOVgraph, there are only some heuristics which help analysts to perform this activity manually. Therefore, this paper proposes a strategy semi-automatic to identify crosscutting concerns in PL-AOVgraph models. This strategy is based on analysis of an adjacency matrix composed of the relationships among requirements. In order to evaluate this strategy, a case study is applied.

## Uma Abordagem para Engenharia de Requisitos Baseada em Modelos no Domínio de Software Embarcado. (short paper)

*Milena Rota Sena Marques, Eliane Siegert and Lisane de Brisolara.*

O projeto de Sistemas Embarcados envolve alta complexidade, pois inclui hardware, software e muitos requisitos não funcionais, além dos funcionais. Todos estes requisitos devem ser considerados durante todo o projeto. Para lidar com esta complexidade, linguagens de modelagem com alto poder de abstração, como UML, são adotadas. No entanto, UML não permite representar requisitos não funcionais e relacionamentos entre requisitos, assim a gerência de requisitos não é suportada por abordagens baseadas em UML. O objetivo deste trabalho é apresentar a abordagem MDEReq, que propõe uma engenharia de requisitos orientada a modelos para software embarcado. Esta abordagem suporta rastreabilidade de requisitos, que permite gerenciar requisitos desde a especifi-cação até a validação. Para suportar a completa especificação dos requisitos, di-agramas UML decorados com estereótipos do perfil MARTE são usados, en-quanto a rastreabilidade é suportada pelo uso de notações SysML. Estes modelos são integrados, facilitando a rastreabilidade dos requisitos em todas as fases do projeto, além de utilizar apenas uma ferramenta para a modelagem de todo o projeto e gestão de requisitos. Um estudo de caso é usado para demonstrar a abordagem proposta.

## Una estrategia de integración de Modelos de Objetivos con Análisis Comunicacional.

*Maria Carmen Leonardi and Roxana Giandini.*

El Análisis Comunicacional (CA) es un método basado en la comunicación para el modelado de proceso de negocio y requisitos que propone el análisis de los sistemas de información desde una perspectiva comunicacional. Este método se basa en analizar los flujos de información. En un contexto de desarrollo TO-Be, donde no se cuenta con documentación previa para analizar, este tipo de perspectiva puede ser complementada con un modelo motivacional, comenzado el proceso de análisis desde una perspectiva de objetivos de la organización, hasta llegar a modelar lo que se quiere hacer concretamente. Este trabajo propone una estrategia de integración entre CA y un modelo de objetivos. Esta integración permitirá captar la intencionalidad y objetivos de la organización en sus diferentes niveles de abstracción, dándole racionalidad al sistema y alineando los procesos con los objetivos.

**Requirements Specification and Elicitation Methods and Tools**

## Buenas prácticas en la especificación del dominio de una aplicación.

*Leandro Antonelli, Gustavo Rossi, Julio Leite and Alejandro Oliveros.*

La ingeniería de requerimientos es un área crítica en el desarrollo de software y particularmente lo es la especificación de requerimientos. Se pueden construir productos tecnológicamente adecuados pero si no cumplen con los requerimientos carecen de utilidad. Sin embargo, no es una tarea sencilla el construir una especificación correcta que describa y logre transmitir el conocimiento, necesidades y deseos de los stakeholders. Por este motivo, es necesario contar con guías que faciliten la tarea de escribir especificaciones de requerimientos. En este artículo, presentamos una serie de guías que tienen por objetivo mejorar la descripción del Léxico Extendido del Lenguaje (LEL). La identificación de las guías se realizó durante un ejercicio de escritura del LEL en donde se recurrió a la literatura para identificar las guías a aplicar como buenas prácticas, y finalmente se realizó un experimento para verificar la interpretación de las especificaciones realizadas utilizando las buenas prácticas propuestas.

## Uso de Sinônimos na Identificação de Requisitos de Transparência.

*Joas Baia and José Luis Braga.*

A transparência é um princípio democrático onde cidadãos desejam obter informações sobre fatos e processos. Nesse contexto, ocorre o aumento da demanda por transparência nas relações humanas. A transparência de software é um requisito não funcional que engenheiros de software precisarão demonstrar à medida que a sociedade exigir transparência em suas relações, pois essas relações são automatizadas pelos sistemas de software. Diante da importância de demonstrar a transparência nos processos de informação, propõe-se nesse trabalho desenvolver técnicas para apoiar o desenvolvimento de software transparente. A proposta é verificar a presença de requisitos de transparência a partir de modelos de requisitos de software representados com o Framework iStar. O modelo de requisitos é analisado utilizando uma base de dados contendo sinônimos dos atributos de transparência, além disso é usado o conhecimento disponível no iStar para identificar esses atributos.

## Correcciones semánticas en métodos de estimación de completitud de modelos en lenguaje natural.

*Claudia Silvia Litvak, Graciela Dora Susana Hadad and Jorge Horacio Doorn.*

La Ingeniería de Requisitos tiene como objetivo producir requisitos de alta calidad, poniendo especial interés en la completitud de los modelos elaborados. Establecer si la información elicitada y modelada es suficiente para construir un software que cubra las necesidades del cliente es una cuestión de difícil respuesta. Existen algunos intentos realizados en ese sentido, tal como una adaptación del método de captura-recaptura para estimar el tamaño de modelos de requisitos escritos en lenguaje natural. Basados en dicho trabajo y considerando la naturaleza de estos modelos, proponemos introducir un análisis semántico previo a estimar el tamaño, dado que el método predictivo solo contempla aspectos formales y cuantitativos. Dicho análisis semántico estudia la relevancia, pertenencia, sinonimia y homonimia del contenido textual del modelo. Comparando los resultados estadísticos de trabajos precedentes contra los obtenidos realizando correcciones semánticas, concluimos que estas son beneficiosas para la estimación de la completitud de modelos en lenguaje natural.

**Knowledge building in Requirements Engineering**

## 25 years of Requirements Engineering in Brazil: a systematic mapping.

*Karolyne Oliveira, João Pimentel, Emanuel Santos, Diego Dermeval, Gabriela Guedes, Jaelson Castro, Fernanda Alencar, Carla Silva, Cleice Souza and Monique Soares.*

The celebration of 25th anniversary of the Brazilian Symposium of Software Engineering (SBES) as well as the forthcoming Requirements Engineering Conference to be held in Brazil for the first time, has led us to have a closer look at the local Requirements Engineering (RE) Community. A systematic mapping was performed in order to find out the main Brazilian research groups, authors as well as their topics of interest and publications with greatest impact. This information may be useful for those that do not know well the local requirements engineering community, such as local newcomers or foreign researchers. It may also help to identify potential groups for collaboration. Similarly, it may provide valuable information to assist local agencies when granting research funds.

## Retrospective and Trends in Requirements Engineering through WER

*Joselaine Valaski, Wilian Stancke, Sheila Reinehr and Andreia Malucelli.*

This work refers to the review of 258 articles published in the WER throughout 15 editions. This review´s goals was to identify the most active research groups within this workshop, the most debated topics and the trends in the Requirements Engineering area. The results showed that Brazil, Argentina and Spain hold the most active groups. Moreover, the results pointed out the requirements modeling as one of the most discussed topic in this event.