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New Opportunities for Software Reuse

17th International Conference, ICSR 2018
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Proceedings

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Foreword

This volume contains the proceedings of the International Conference on Software Reuse (ICSR 18) held during May 21–23, 2018, in Madrid, Spain. The International Conference on Software Reuse is the premier international event in the software reuse community. The main goal of ICSR is to present the most recent advances and breakthroughs in the area of software reuse and to promote an intensive and continuous exchange among researchers and practitioners.

The conference featured two keynotes by John Favaro, Intecs SpA (Italy) and Alberto Abella from MELODA (Spain). We received 29 submissions (excluding withdrawn submissions). Each submission was reviewed by three Program Committee members. The Program Committee decided to accept 11 papers (nine full papers and two short ones), resulting in an acceptance rate of 37.9%. The program also included one full-day tutorial, one invited talk, and a panel about the future of software reuse.

This conference was a collaborative work that could only be realized through many dedicated efforts. We would like to thank all the colleagues who made possible the success of ICSR 2018: Barbara Gallina, Carlos Cetina, Mathieu Acher, Tewfik Ziadi, Roberto E. López Herrejón, Gregorio Robles, Jens Knodel, Carlos Carrillo, and Alejandro Valdezate. We also thank the ICSR Steering Committee for the approval to organize this edition in Madrid.

Last but not least, we would like to sincerely thank all authors who submitted papers to the conference for their contributions and interest in ICSR 2018. We also thank the members of the Program Committee and the additional reviewers for their accurate reviews as well as their participation in the discussions of the submissions. Finally, we thank Danilo Beuche for his tutorial and the members that participated as panelists including the support from people of The Reuse Company (Spain).

March 2018

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Abstracts of the Keynote Talks

New Opportunities for Reuse in an Uncertain World

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Abstract. Twenty-five years ago, as the software reuse community was being established, the outlines of a research program in reuse were clear and its dimensions could be well-described with the application of the Three-C's model of Concept, Content, and Context. In the years that followed, researchers pursuing that program elaborated results in the precise specification of reusable artifacts, from feature modeling to component contracts (Concept); implementation, such as powerful generative methods (Content); and models and frameworks ensuring correct and effective integration (Context). Success was such that reuse has become a part of the everyday development process, and the death of general software reuse research has been hypothesized in some quarters. That hypothesis is premature. The world of applications is much more uncertain today, and that uncertainty is challenging reuse in all of its dimensions. Our previous understanding of Context is breaking down under the ambitious autonomous applications in robotics, IoT, and vehicles, whereby components are now being reused in scenarios that can no longer be completely characterized (the unknown-unknowns). Equally ambitious applications of advances in machine learning are challenging our previous understanding of Content, whereby the training and self-modifying implementation of such learning components becomes quickly inscrutable to humans, and dynamic variability in components and product lines is challenging our understanding of what implementation even means today. Even the idea of Concept is being challenged as attempts are made to reuse poorly specified knowledge artifacts in support of innovation management. Uncertainty brings new challenges with it, but it also brings new opportunities. The uncertain world of today's applications is laying the foundations for the next research program in software reuse.

The Challenging Future of Open Data Reuse

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Abstract. Since the first open data portal was launched in 2010 in Spain more than 20.000 datasets have been published. Nowadays, more than 100 active open data portals, mostly coming from the public sector, have been launched and E.U. open data website encompasses around 800.000 datasets coming from 31 countries as an active ecosystem. Although there is an increasing demand for open data reusable assets there is a need to estimate the social and economic impact of new investments and resources. Today, open data managers must deal with two main issues: (i) the available data reflects a poor management of the current open data portals' managers, including an astonishing percentage a complete absence of analysis of the use of published data, and (ii) a lack of sound models to assess this impact. Currently, two disciplines have emerged to cope with these challenges: data governance and open data coordination. Data governance creates a new business function in the company to care about the organization's data. Open data coordination refers to the need to make linkable the published data. The promising linked data paradigm struggles to link 'every' data published in the web due to the overwhelming amount of datasets published. In this keynote talk we will discuss a timeline describing the main achievements in the open data during the last decade and how to face the current challenges of open data reuse.

Reuse in (re)certification of Systems

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Abstract. The reduction of time and cost for the creation of a safety case is an urgent challenge that industries must face in the context of safety-critical product lines. A safety case is a contextualized structured argument constituted of process and product-based sub-arguments to show that a system is acceptably safe and thus "assure society at large that deployment of a given system does not pose an unacceptable risk of harm". Safety assurance and assessment processes required by standards and jurisdictions use to span several years and consume a large number of resources. To reduce time and cost, reuse capabilities are being investigated. At the core of this effort, there is the objective to provide a generic metamodel capturing concepts of safety compliance processes. This is opening many doors towards a common model-based certification framework that can simultaneously target diverse domains such as the automotive, railway, avionics, air traffic management, industrial automation, or space domains. Then, different recurrent scenarios of (re)certification are being studied with their own characteristics and challenges. For example, in the system upgrade scenario we aim to identify the parts of the safety assurance project that can be reused for the upgraded system. In the cross-standard reuse scenario, the same system certified against a standard needs to be certified with another standard or, in the case of jurisdictions, checking compliance with a country jurisdiction that differs from the current one. In the cross-concern reuse scenario, a system certified against a given standard (e.g., security related) requires to be certified with a standard targeting a different concern (e.g., safety). The AMASS project (Architecture-driven, Multi-concern and Seamless Assurance and Certification of Cyber-Physical Systems) continues previous efforts to define the Common Assurance and Certification Metamodel (CACM) and a tool-based platform is being developed. Among its functionalities, advanced techniques are provided enabling reuse by combining process lines, product lines and safety case lines.

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Managing Variability with Feature Models (Tutorial)

Danilo Beuche

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Abstract. Many organizations develop software or software –intensive products, which are can be seen as variants or members of a product line. Often the market demands variability and the software organization expects productivity benefits from reuse. In any case, complexity of the software development increases. Variability and variant management plays a central role in this, when it comes to mastering the complexity.

1 Topic

The tutorial aims at providing the essential knowledge for managing variability in product lines using feature models. It explains the concept of feature models and their role in product line engineering, such as how feature models can be used to control development and also product configuration. The tutorial is highly interactive and includes several practical exercises for the attendees. In this tutorial we cover the use of feature modelling for controlling the variability throughout the product line engineering process. Therefore, this tutorial covers the following topics:

- The importance of explicit variability modelling.
- Methods for managing variability in a product line.
- Concepts and Methods for creating correct and maintainable feature models.
- How to use feature models to control variability in product line assets.

With these topics we cover technological, organizational and business aspects of variability management for product lines, enabling practitioners to start with feature modelling on a solid basis. The intended audience are practitioners that want to learn how to carry out variability modelling (with feature models) for product line successfully.

2 Plan

The tutorial consists of three parts:

1. Introduction
   a. Product Line Basics
   b. Development Scenarios

2. Feature Modelling
   a. Basics
   b. Feature Modelling Exercise 1
   c. What is a feature?
   d. Feature Modelling Exercise 2
3. Using Feature Models
   a. Linking feature models to assets
   b. Maintaining feature models
   c. Common Pitfalls

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