5th International Workshop on Traceability in Emerging Forms of Software Engineering (TEFSE 2009)

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Abstract

Traceability of Emerging Forms of Software Engineering (TEFSE) 2009 will bring together researchers and practitioners to examine the challenges of recovering and maintaining traceability for the myriad forms of software engineering, from user needs to models to source code. In the 2007 instalment, TEFSE focused on the grand challenges of traceability. The 2009 instalment will focus on these and other emerging challenges in traceability.

1. Theme and goals

Software production for the mass market requires the adoption of techniques and approaches to increase software development productivity. The great pressure to produce has promoted approaches derived from manufacturing, such as component-based development and standardization. The underlying assumption is that the software industry may improve productivity by applying similar approaches to those used in manufacturing. Despite the adoption of reuse, the availability of commercial off-the-shelf components, and the existence of code generators, middleware, frameworks, and rapid application development tools and techniques, the software industry is still far from the anticipated productivity level. Moreover, software development represents a small part of the software life-cycle as software systems continuously evolve to meet ever changing user needs, which may be driven by market pressure, adaptation to legislation, or improvement needs.

In today’s competitive market, the pressure to increase productivity results in the tailoring of software processes, especially development and evolution processes, to eliminate unproductive activities. Establishing and maintaining traceability links and consistency between software artefacts produced or modified in the software life-cycle are costly and tedious activities that are crucial but frequently neglected in practice.

Traceability has been defined as “the ability to describe and follow the life of a requirement, in both a forwards and backwards direction” [5]. Thus, traceability between free text documentation associated with the development and maintenance cycle of a software system and source code are crucial in a number of tasks such as program comprehension, software maintenance, and software verification & validation. Finally, maintaining traceability links between subsequent releases of a software system is important for evaluating relative source code deltas, highlighting effort/code variation inconsistencies, and assessing the change history.

The objective of the 5th edition of TEFSE is to build on the work the traceability research community has completed in identifying the open traceability challenges. The workshop is structured around these challenges. In particular, it is intended to be a working event focused on discussing the main problems related to software artefact traceability and propose possible solutions for such problems. Moreover, the workshop also aims to identify key issues concerning the importance of maintaining traceability information during software development to further improve the dialogue between academia and industry and to facilitate technology transfer. The workshop will explore topics related to:

- Definitions of traceability models
- Traceability between artefacts and processes
- The semantics of traceability links
- Recovery and evolution of traceability links
- Visualization of traceability links

A web site (http://web.soccerlab.polymtl.ca/tefse09/) for the workshop will be developed and maintained by the organizers. The discussions and presentations from the session will be summarised and publicised on the web site and other appropriate venues.

2. Previous editions of TEFSE

TEFSE was originally initiated by Andrea Zisman and George Spanoudakis. For the past three years it has expanded its steering committee to include Jane Cleland-Huang, Jane Huffman Hayes, and Jonathan Maletic. It is closely associated with the Center of Excellence for Traceability, initiated in the summer of 2007. The fourth
3. Summary of the contributed papers

This year we received 12 submissions from 31 authors, coming from four different countries (Japan, Korea, Germany, USA). The program committee selected 11 papers, which will be published in the ICSE workshop proceedings. The contributed articles address the problems summarized below.

One of the main challenges of traceability is the recovery and the evolution of traceability links. Winkler [13] presents several enhancements for recovering traceability links between evolving artefacts, while McMillan et al. [11] propose an approach to improve requirements traceability based on Information Retrieval (IR) techniques by taking into account the syntactic dependences among code components. Ratanotayanon and Sim [12] present Zelda, a tool for associating arbitrary lines in text-based files with a feature map. The tool is also able to automatically track and present the locations of these links in subsequent versions of the artefacts.

The contributed articles also address the problem of defining novel traceability models and techniques. Cleland-Huang et al. [4] present a model-based approach designed to help organizations gain full benefit from the traces they develop and allow project stakeholders to plan, generate, and execute trace strategies in a graphical modelling environment. Helming et al. [7] propose a unified model that explicitly combines project management models and system specification models to enable traceability. Maletic and Collard [10] present an XML-based language supporting queries across multiple artefacts and multiple traceability link types. Finally, Mäder et al. [9] highlight the typical decisions involved in creating a basic traceability information model, suggest a simple UML-based representation for its definition, and illustrate its central role in the context of a modelling tool.

New trends in traceability are discussed in [2], [6]. In particular, Asuncion and Taylor [2] discuss how to use e-Science techniques to link heterogeneous artefacts and capture custom link semantics. Hayes et al [6] discuss the opportunities, challenges, and plans for improving traceability management during test-driven development (TDD), an emerging software development practice.

We also received experience reports on the use of traceability models and techniques in an industrial context. Leuser [8] describes the challenges of IR-based traceability link recovery between requirements in the automotive domain. Finally, Armbrust et al. [1] discuss their experience of adopting an approach for establishing and maintaining traceability between software development standards at the European Space Agency and the Japan Aerospace Exploration Agency.

Acknowledgments

The organizers want to thank all the reviewers and the authors for their contribution to a workshop that promises to be very interesting and productive for the traceability research community.

References


